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AUTOMOTIVE INDUSTRIES
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46 Companies Made 1,000 or More Cars in First Half of 1923

Analysis shows gratifying percentage of gain for smaller producers. Practically all in "over 1,000" class strong financially. What figures show.

By James Dalton

THERE were 46 companies in the passenger car field which produced 1000 or more cars in the first half of 1923 as compared with 52 companies which made 1000 or more in 1922.

The smaller of these companies are showing a relatively larger percentage of gain than the larger.

Practically all of them are sound financially and the structure of the industry is stronger in this respect than ever before.

The analysis of production figures which is contained in this article indicates that there is little basis for the contention that automobile production is becoming more closely concentrated in the hands of a few companies.

ANALYSIS does not bear out the contention that production of passenger automobiles is being more closely concentrated in the hands of a few companies. As a matter of fact, notwithstanding the enormous output of the leaders, the trend is in the other direction.

Compared with a few years ago, the list of companies has shrunk sharply, but there still are left nearly fifty with more than a fair chance of survival in the era of keen competition which now is under way.

At the close of last year 98 companies were in production and 52 of them had made 1000 or more cars in the year. At the end of June, 1923, there were 92 companies in the field and 46 of them had made 1000 or more in the first half year. Seven had dropped out of the "over 1000 class" because of financial difficulties and one had been added to it because of improved merchandising. Nearly all those which had fallen by the wayside failed because of over-expansion in boom times or some other fault of management.

Any company which can sell 1000 automobiles in six months, or at the rate of 40 a week, should be able to return a profit. Any company which can sell that many in a year may show a profit. On the other hand, any company which cannot sell 1000 in a year, unless its products are in the highest price class, has mighty little chance of survival in the battle for business if it persists in seeking NATIONAL distribution.

Eleven of these companies, most of them comparatively small, actually made more automobiles in the first six months of this year than they did in all of 1922. A dozen more made almost as many. The little fellows made a better showing, relatively, than

the big ones. That is, their percentage of gain was higher.

There were ten companies which made from 1000 to 3000 motor cars in 1922 with a total of 16,960. In the first half of this year the same concerns made 19,755 or 116 per cent of the output for the full year of 1922.

THE ten leading companies in point of units made 2,000,000 automobiles last year and 1,604,000 in the first six months of this year or 80 per cent of the 1922 total.

Speaking in general terms, nine of the ten small companies are in the medium price field and there is a range of only a few hundred dollars between their models. The one exception is in a higher price class.

Six of the ten leaders, on the other hand, sell for less than $1,000 and four of them, in the lowest price class, made a total of 1,200,000 in the first half or 60 per cent of all the units credited to the ten.

It would seem, therefore, that small companies in medium price class are making relatively the best showing in the race for business.

The 52 companies in the 1000 or more class in 1922 made 2,309,000 or 98.3 per cent of the total of 2,339,000 passenger cars produced in that year.

The 46 companies in the same class in the first half of 1923 made 1,846,000 or 99.4 per cent of the total production of 1,858,000. Unless the "tail enders" increase their sales in the second half, which is not probable, their percentage of the total business will be smaller this year than it was last.

There were exactly 20 companies in 1922 which had a production of 10,000 or more. They made a total of 2,196,000 or 93.8 per cent of the total. The same companies in the first half of 1923 made 1,759,000 or 95.2 per cent.

Thirty leading companies in 1922 made a total of 2,268,000 or 96.9 per cent. The same thirty companies in the first half of 1923 made 1,807,000 or a total of 97.8 per cent.

Ford production in 1922 was 1,100,000 or 47 per cent of the total and in the first half of 1923 it was 800,000 or 43.3 per cent.

With the thirty leading companies making 2,268,000 in 1922 there was left 70,000 units to be divided among about 70 companies giving an average of 1000 each. The first thirty companies in the first half of 1923 made 1,807,000, leaving 40,000 to be divided among about sixty companies.

A little further analysis shows that the first ten companies in 1922, which made 2,000,000 automobiles, had 85.4 per cent of the total. The same companies which remained the ten leaders in the first half of 1923, made 1,604,000 in that period, or 85.7 per cent of the total.

IN 1922 there were five companies with a production exceeding 100,000 and their total was 1,725,000. Strangely enough, there also were five companies with a production exceeding 100,000 in the first half of this year, with a total of 1,605,000, but the leading quintet included two companies which were not in it last year.

It is true today, as it always has been and always will be, that 20 or 25 companies will make, in point of units, all but a small percentage of the automobiles produced in this country, but as demand expands and output increases, the smaller concerns can continue to increase their gains.

Going carefully over the list of 46 companies in the "over 1000 class," one significant fact stands out. It is that only two of them, so far as is generally known, at least, are in serious financial difficulties and both of them may pull through. In this respect the roster is stronger than it ever was before. With prudent management and skillful merchandising, there is no reason why every one of them should not live and prosper. The situation is much better than it was a year ago.

This list covered exactly half those in the field at the end of June. It must be confessed that a good many of the remaining 46 are in a bad way financially, with mighty little chance of recovery. On the other hand, there are a score or more which build largely on a custom basis or which are in strong enough hands to assure their continuance in business. A few of them are in the highest price class and do not seek quantity production.

The passenger car industry has been going through a rigorous shaking down process since the collapse of 1920 and most of the "weak sisters" have definitely lost their grip. As a consequence, the structure is unprecedentedly strong. There will be changes from time to time, inevitably, but they will not be so rapid nor so striking unless there is a collapse in general business, which is not probable.

ECONOMISTS and business doctors have written much in the last two or three years about the necessity for combinations and consolidations among the small production companies if they are to live, but there are no indications that such amalgamations are under way or in prospect so far as the strongest of the smaller companies are concerned. Nor, indeed, are they necessary. These companies are just as substantial, in proportion to their size, as the larger ones. They promise to remain on the map next year, the year after and indefinitely.

There are about two and a half times as many companies in the passenger car field as in the truck branch of the industry, which give every indication of being able to survive on a national merchandising basis in the struggle for business. As AUTOMOTIVE INDUSTRIES pointed out last week, only 20 truck companies out of more than 100 made 1000 or more units in 1922 and there were only 15 which reached the 1000 mark in the first half of this year.

The situation in the two branches of the industry is much the same, however, except that there are more weak truck than automobile concerns which are hanging on desperately in the hope of pulling through. Practically all the twenty leaders are strong financially.

In discussing the truck situation, we pointed out that some of the weak concerns might save themselves by cultivating intensively a circumscribed market or specializing in some definite vocational field. Similar conditions prevail in the passenger car field. It is not at all certain that some of the companies which are in the "over 1000" class and which probably can survive on a nationally competitive basis might not have made more money if they had confined their selling effort to a well-defined group of states radiating from their factories.

It would not be difficult to name several companies which started under favorable auspices, but which failed because they tried to expand too rapidly and sell in all parts of the country when they might better have developed first the market near home.

In both passenger and commercial car fields there are

two major problems for all companies, no matter how large they may be. They are:

1. Merchandising.
2. Service.

The struggle for dealers is just as keen as for sales. When a company distributes its products nationally, the more dealers it has the better service it gives. Obviously, the small company cannot go into the dealer market and bid for good men against the large production company in the same price class. Under the circumstances, the best it can do, except in the very large cities, is to induce some able dealer for a non-competitive line to take on their line and push it as hard as possible.

There are passenger car companies advertising today in national mediums which have no worthwhile representation in large sections of the country. The money they spend to reach readers of those publications in the districts where they are not represented is practically wasted. If such companies would analyze their sales reports they would find that the major part of their business is in relatively few States. Such being the case, they should cultivate those markets intensively while expanding their representation systematically instead of haphazard in the areas where they have few dealers.

While the smaller companies would be foolish not to seek the best representation possible and demand results of their dealers, they cannot afford to be unreasonable. Just as an example:

A company which produced about 7000 cars in 1922 and about 6000 in the first half of 1923, took on as dealers in a good-sized New York State city a firm which was handling a semi-competitive line. The quota fixed for the first year was 102 cars. It was a new territory for this company, including four or five counties with a population not exceeding 350,000. The new dealers worked hard and advertised liberally, with the result that they sold 50 cars in the first twelve months with the prospects good for the next year's business. Then the company refused to renew the contract on the grounds that the quota had not been taken and that the dealers handled a competing line, although it knew all about the competition when it signed the contract.

IT would seem that this procedure was somewhat arbitrary, to say the least. If the company had the entire country covered with dealers, each with a territory containing a similar population and each dealer had done as well as the firm whose contract was not renewed, its annual sales would be at the rate of 15,000 or about twice its current production figure. This particular case was taken up by the dealers' association in the city in which it arose. Not only is it likely that this car will be excluded from the annual show, but it will be virtually impossible for that company to get representation in the city in question for a long time to come.

Dealers are more independent than they ever were before. They are determined to make money and they will not submit to unjust factory domination. For that reason companies which hope to increase their sales must cooperate with dealers rather than antagonize them, and establish a reputation for fair dealing.

As every one in the industry knows, it is repeat orders which mean permanent success and repeat orders are exceedingly unlikely unless satisfactory service is given. For that reason if no other, the smaller companies are under the necessity of studying the service problem carefully. There is one important factor in their favor which they will make a grave mistake in overlooking. Most of them turn out an assembled product and they will receive the whole-hearted assistance of the parts makers with whom they deal in seeking a solution of the service question. Parts makers, generally speaking, seem more concerned about the necessity of service than the assemblers either of cars or trucks.

NO general formula can be presented for meeting the difficulties of individual companies in either the passenger car or commercial vehicle fields, but they can be worked out unless the concern is hopelessly involved financially. We have simply attempted to outline two or three general principles.

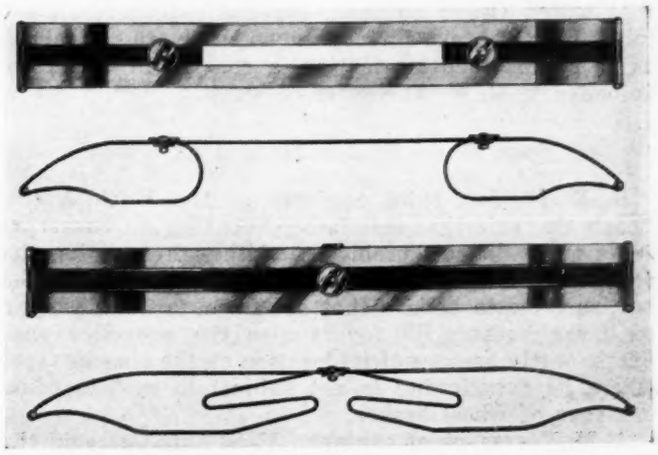
The big fact which stands out after an analysis of passenger car production figures is that the smaller companies which are sound financially seem to be growing stronger rather than weaker in their relations with the public. Unquestionably there is a large demand for motor vehicles of an individualistic type, especially if they do not cost too much. A great many Americans want something different, be it either clothes or automobiles.

With the process of elimination which has been going on for three years almost complete, the automotive industry is in a stronger position today than it ever was before. Most of the weaklings have passed out of the picture and practically all those which remain, especially those in the "more than 1000 class," have built on a solid foundation.

If they continue to manufacture economically, merchandise wisely and give the public full value for its money, they need have no fear of the future for they will be assured of a substantial share of the wonderful automotive market.

Two New Spring Bumper Designs

TWO new bumper designs have been brought out by the Protection Automobile Bumper Co. Each will be made in three sizes and finished in nickel and black enamel. They are made of spring steel, heat-treated and oil-tempered. The bumper with the full design spring will be known as the full spring bumper and the other as the semi-spring bumper.



Protection automobile bumpers, full spring and semi-spring design

Crane Expounds Catechism of Brake Design and Construction

Good four-wheel brakes are a real engineering achievement, and there are some in this category, he says, but is silent on most topics peculiar to this type. Durability and satisfactory service readily attained if fundamentals are understood and applied.

DESIGN and build braking systems with due regard to fundamentals and most of the criticisms of brakes in general will disappear. This, in brief, was the burden of the paper entitled "Some Notes on Brake Design and Construction," read by Henry M. Crane before the Metropolitan Section of the Society of Automotive Engineers in New York last week.

To demonstrate that this conclusion is substantiated by actual service, Crane exhibited a lining which he said had been taken from a foot-operated propeller shaft brake after use for 65,000 miles. This lining was still in excellent condition, evenly worn, but not nearly down to the rivet heads, a condition attributed to correct design and construction and to the occasional application of a small quantity of heavy oil which had prevented deterioration of the copper wire-asbestos band.

Discussion of the paper, which dealt largely with fundamentals of brake design without specific reference to four-wheel brakes, developed but little information not contained in the paper. The paper is printed on following page in condensed form.

A. Ludlow Clayden expressed the view, evidently in reference to four-wheel brakes, that American passenger car makers in general seem to prefer to add complication and stick to manufacturing methods which leave much to be desired in respect to quality, rather than spend the same effort in building the simpler thing better.

Asked whether he did not consider the four-wheel brake more of a sales than an engineering achievement, Crane came back with the rejoinder that a *good* four-wheel braking system is a real engineering achievement and that there are some good four-wheel brakes.

Andrew L. Riker said that his experience bears out that which Crane outlined, especially in reference to lubrication of brake surfaces when these are so designed as to permit such lubrication, a conclusion which was seconded by R. W. A. Brewer.

Four-Wheel Brakes Needed on Buses

R. E. Fielder, chief engineer of the Fifth Avenue Coach Co., said that satisfactory braking on buses presents many difficult problems. Although realizing that four-wheel brakes add some complication, he said that he has come to believe that such brakes are necessary on large buses. He favors also the propeller shaft brake, partly because of its location on the chassis frame where its functioning is not subject to certain disadvantages of wheel brakes.

A. M. Yocum, chief engineer, U. S. Axle Co., said that some of the disadvantages of rear-wheel brakes include long and rather springy rods, heavy retractor springs and difficult adjustment and equalizing. He commended the propeller shaft brake, partly on account of the short and positive connections which are possible and partly because of the ease with which it can be adjusted from the driver's seat, and said that any weight increase in rear axle parts which the propeller shaft brake may make necessary is offset by the reduction in weight which is effected by taking one set of brakes off the rear axle. Short operating rods are also among the advantages of front-wheel brakes, said Yocum.

Several speakers referred to the desirability of easier brake adjustments, one or two to the need for correct layout of operating rods and levers, one to the possibilities of slack adjusters and air-operated brakes, and two or three to the desirability of metal to metal braking surfaces.

Easy Adjustment Essential

In summing up the discussion, Crane said that accessible and easy adjustment of brake mechanisms is important but that automatic adjusters are unnecessary, especially if the brake is properly designed and constructed at the start. He added that chilled cast iron makes a good brake drum, partly because its hardness is not affected by the heat generated in braking. With the Hotchkiss drive, a brake rod layout in which the rod is parallel to the main leaf of the spring and the lever depending with its end close to the axle has proved quite satisfactory.

When engine is used as a brake, said Crane, carbureter throttle should be closed so that it is actually tight shut. Backfires will then seldom occur, especially if a correct carbureter adjustment is employed. The substance of some further replies to questions asked by various section members follows:

If operating conditions permit, lubrication of brake surfaces is desirable, provided the surfaces are protected from dust and dirt.

Band brakes should be lined with asbestos-copper fabric but molded facings have been used satisfactorily on shoe brakes.

The car from which the brake lining exhibited had been taken weighed 5300 lb., had 35 x 5 in. tires and 3.2 to 1 axle gears. The brake of which the lining was a part was on propeller shaft and was sufficiently powerful to lock rear wheels.

Quick stops, even though frequently made, are not apt to be as hard on brakes as continued application on long grades, because of the higher temperatures attained in the latter case.

Power absorbed by engine when it is employed as a brake is used up chiefly in overcoming friction in pump-

ing losses. The outside front wheel is not released in the case of all front-wheel braking systems when the car makes a turn. When it is so released the purpose is to facilitate steering.

Metal to Metal Brakes

Metal to metal brakes are not used more often chiefly because of their lower friction coefficient as compared to conventional lining materials. They are satisfactory for propeller shaft brakes, provided their temperature can be kept sufficiently low. So-called "plastic" bronze with high lead content has been successfully used for one friction surface in some cases.

The best drum material is one which is as hard as manufacturing conditions admit and which remains hard in spite of high temperatures sometimes attained. Steel with a carbon content of 60 to 90 points is good but requires forging. Chilled cast iron is excellent.

One fault of the multiple disk brake is that it is hard to get it to release fully within the space usually available.

Tests made at the Bureau of Standards have shown retardation rates as high as 13 ft. per sec. per sec. with two-wheel brakes and 25 ft. per sec. per sec. with four-wheel brakes. Even the lower rate is apt to be uncomfortable for passengers and even throw them from their seats, especially if they do not expect the sudden application.

Railway practice indicates that it is better to release brakes before wheels come to a full stop. This is probably true also with automobiles.

In propeller shaft brake design it is just as important to provide adequate areas as with wheel brakes. Care should also be taken to place the anchorage close to the band in order to avoid jamming or wedging of the band between anchorage and drum. Crane showed two designs of brake incorporating various features which he advocates. One of these drawings was reproduced in AUTOMOTIVE INDUSTRIES for Dec. 29, 1921.

A condensed transcript of Crane's paper follows:

Probably the simplest of the functions which brakes must serve is the maintaining of the vehicle at rest on the level or on varying grades. Another function is the reducing of the speed of a moving vehicle to a lower speed or to an absolute stop, either on the level or on ascending or descending grades. Still another function is the maintaining of a constant vehicle speed on a descending grade.

The first function mentioned is the simplest one. As there is no motion involved in this case, no heating conditions have to be considered and no particular smoothness of operation or resistance to wear is needed, and even an inaccurate layout of the operating connections between the frame and axle may not cause any real trouble.

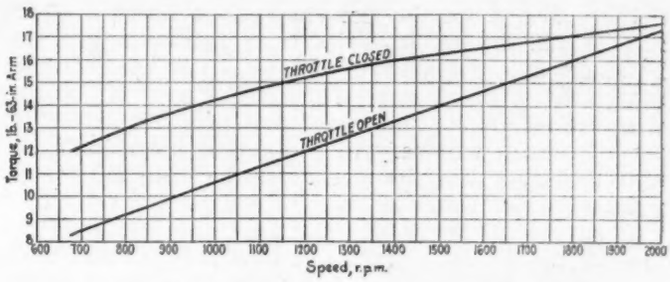
There has been more or less discussion recently about the effectiveness of the engine as a brake, and for this reason I am glad to be able to give you, in accompanying curves, the results of a test recently made on a passenger car engine of normal design. The engine in question—4¼-in. bore and 5-in. stroke—had six cylinders and a piston displacement of 425 cu. in.

These curves are taken with both the oil and water at maximum running temperatures. These curves can undoubtedly be translated for various sizes of engine by comparing piston displacements. It is interesting to note that the retarding effect is considerably higher, especially at the lower speeds, when the throttle is closed than when the throttle is open. This is particularly fortunate, as it somewhat simplifies the use of the engine as a brake.

In discussing the various desirable features of brake design and operation no attempt will be made to list these features in order of preference. Unless they are all kept in mind and each one given serious consideration in arriving at a final conclusion, first-class results cannot be expected.

There is some question as to just how far it is desirable to go in reducing the physical effort required to slip the braked wheels. In the case of a good driver the least effort possible will give the most satisfactory results. In the case of unskilled drivers, however, there is a tendency to push or pull as hard as possible in an emergency and a brake that is too easily operated is apt to result in a violent skid under such treatment.

Smoothness of retardation is necessary for the comfort of the passengers. Chattering or grabbing brakes



Curves showing frictional resistance offered by a 4¼ x 5 in. six-cylinder engine when used as a brake

reduce braking efficiency and increase danger of skidding.

A retarding effect directly proportional to pedal pressure is necessary to allow of an accurate control of the braking effect under different conditions and road surface. It can be obtained only where there is a minimum of friction and uniform friction throughout the brake operating mechanism and uniform spring in the mechanism.

There should be no tendency to be self-locking. This is, to some extent, another way of stating the previous requirements. It is not exactly opposed to brakes of the wrapping type, although it is very difficult to design such brakes without some of this undesirable feature. It is intended to apply more directly to mechanisms that have a tendency to jam under certain conditions, making it difficult to reduce the braking effect without almost completely releasing the brake and reapplying.

Durability or long life, resulting in infrequent necessity for replacement of friction surfaces and correspondingly infrequent adjustment, is desirable.

Uniform Braking Action Desirable

Ease and simplicity of adjustment when adjustment is required is desirable, as is also uniform action under all conditions. That is, retarding effect should be maintained throughout long, severe brake applications and should not be altered materially by weather or other outside conditions. Of course, the latter point refers only to the brake mechanism and cannot be controlled as regards the road surface.

Locking devices for hand brake or other car locking brake should be strong, easily operated and thoroughly dependable. This locking equipment is really a safety device of great importance. When inefficient it has been the cause of serious accidents.

Brake operating levers should be easily and quickly

reached in emergencies. This applies equally to the pedal which ordinarily operates the service brake and the hand lever which operates the so-called "emergency" brake. As a matter of fact, in current practice the pedal is the real emergency brake, the hand brake being used only when the foot-operated brake fails to produce the desired results. This being the case, it is obvious that the pedal should be placed with the greatest care in a position such that it can be reached with a minimum of motion and a maximum of certainty.

This requires a careful consideration of its relations to the accelerator pedal, with a view to making the transition of the foot from the accelerator pedal to the brake pedal the smoothest possible and also with a view to insuring that the operation of the brake pedal cannot result in depression of the accelerator pedal at the same time.

Power Available for Brake Operation

Disregarding for the moment various forms of servo-mechanism, the power available to operate brakes may be stated approximately as follows: For the foot-operated brake a pedal motion of from 4 to 5 in., coupled with the maximum convenient foot pressure. This latter, of course, will vary with different individuals, and it is desirable that the mechanism be designed for the weakest driver who may have to operate the vehicle.

It should be borne in mind that the clutch is frequently thrown out at the same time that the foot brake is operated, which will absorb from 30 to 50 lb. of the available force.

For the hand brake a total motion of from 12 to 15 in. may be used, coupled with the driver's available pulling power. It is recognized that frequently greater pedal and hand lever motion is provided than stated above, but this cannot be done without making the brake operation much less convenient and more uncertain in cases of emergency.

Of course, by the use of some form of servo-mechanism, varying from the wrapping type of brake to the entirely separate mechanism, in which the driver supposedly furnishes the control and the mechanism furnishes the power, almost any results are possible.

Possible Pressure on Braking Surface

The possible pressure of a brake shoe or band on a drum is the push of the driver's foot or the pull of the driver's hand, multiplied by the total motion of the driver's foot or hand, divided by the total motion of the brake shoe or band. From this must be subtracted losses due to friction in the operating mechanism and to lost motion and spring in the parts. It is quite possible for a well-designed set of brake connections to accomplish the same results with a given type of brake mechanism with half the pedal motion necessary in another linkage of inferior design.

There have been too many cases in the past in which either excessive pressure has been required for a given braking effect or in which the actual motion of the bands or shoes has been reduced to such a point as to make correct adjustment difficult and frequently necessary. In some cases, either the brakes will not hold properly when applied or if adjusted to do so will drag when released as fully as possible.

Some principles that have been found to be of great help in producing the best possible results are as follows: Have the linkage as simple and direct as possible; use the greatest care in studying the relation of brake connection centers; place brake connections operating brakes on axles and wheels so that the relative motion of axle and frame will not affect operation of linkage.

It is entirely possible, even with cars using the Hotchkiss drive, to accomplish this desirable result in an almost perfect manner. To do so it is necessary to bear in mind that the axle rotates more or less, due to the torque reactions produced in braking. It has been found to be of great assistance in handling this difficult portion of design to have the major portion of the multiplication of leverage take place at the brake drum. If this is done the strains in the operating mechanism are reduced to a minimum while the longitudinal motion is increased to a maximum. Obviously, if the brake rods leading from the frame to the axle move 6 in. during brake application, the effect on braking of the variations in centers will be far less than if the motion be 2 or 3 in.

Keeping in mind the work to be done by any brake it appears that there are two points of importance to work out in the design—one being the low rate of wear and the other being a high rate of heat dissipation. Low rate of wear, other things being equal, will, of course, be best obtained by low unit pressures between the rotating cylinder and the friction band or shoes. This requirement indicates the desirability of brakes of large linear dimensions.

Large linear dimensions are also of considerable value in obtaining a high rate of heat dissipation, but it must be borne in mind that over long continued brake applications the heat dissipation will be governed largely by the ability of transfer from the brake mechanism to the surrounding air.

Good Cooling Helps Brake Effectiveness

For this reason brakes of small size that arrange to provide for rapid air circulation may easily be more effective than much larger brakes, which are more or less shielded from the air, either by parts of the brake mechanism or of the car. Large and heavy brake parts have the advantage that they can absorb a great deal of heat during a short brake application, which heat is gradually dissipated to the air during intervals between applications.

As a matter of fact, the ability to dissipate heat is very closely connected with ability to resist wear, for the reason that in almost all combinations of braking surfaces the wear becomes much more rapid as the temperatures become higher. This is probably due, fundamentally, to the natural softening of the metal or metals used as the temperatures become higher.

About the hardest problem the car designer has to face in laying out the brake equipment is the decision as to just how great a size and weight can be afforded. In the lighter cars the weight question is of the greatest importance, as there is usually ample room to provide brakes much larger than are commonly used. On heavy cars the size limitation appears to be the more important and it affects both diameter and width that are possible without seriously compromising other features of the car design.

Some Limiting Factors in Brake Design

Use of smaller wheel centers has resulted in a very definite limitation on the diameter of wheel brakes, while the diameter of the propeller shaft brake is closely limited by road clearance and the space available under the floor of the car. There is one very unfortunate complication in brake design, due to the necessity of protecting the brakes as far as possible from mud and dust, to obviate wear. It is almost impossible to carry out such protection without considerably interfering with proper heat dissipation.

In emphasizing the desirability of low unit pressures it should be remembered that no absolute figure can be given, as the maximum safe unit pressure is bound to depend upon the material used in the brake drum and friction surface. If the brake drum has a very hard surface and a suitable friction lining is used, it is possible to use unit pressures much higher than where the drum surface is soft and the friction lining inherently weak. In any case, however, it is highly desirable to keep the unit pressures as low as possible, both by using as large brake dimensions as the design will permit and especially by insuring that the pressure is uniformly distributed over the whole braking surface.

Engine Should Be Used as Brake

As far as I can see at the present time it is hardly necessary or desirable to provide 100 per cent braking without the use of the engine for all possible conditions of surface. The tax would be too great on the average car user and merely for the benefit of the user traveling in mountainous country at fairly high speed. The engine is such an excellent brake, under suitable conditions, that it seems only reasonable to expect it to do its share of the work.

The general features of the band type are light weight and large friction area. With a properly designed band brake there is very little tendency to distort the drum, and minor distortions of the drum will not interfere with smooth brake operation. The large area of contact is due to the ability of the band type to utilize almost the entire circumference of the brake drum while still providing for proper clearance when released.

The external band is considerably the easier to design, as the anchor point can be placed at almost any desirable position, depending upon the amount of wrapping effect required. This is not true of the internal band, which requires it to be of the wrapping type, to spread the pressure over the whole surface available. It is only the compression side of an internal band that is used to advantage, the tension side tending to pull away from the brake drum and thereby to concentrate any pressure at the ends.

Advantages of Band Brakes

An advantage of the band type is the ability to provide almost the entire multiplication of leverage directly at the band and the brake adjustment as well. The band brake, unless of fairly expensive construction, is more apt to rattle and harder to keep from dragging than a properly designed shoe brake. On wheel brakes it undoubtedly interferes to some extent with the proper dissipation of heat. On a propeller shaft brake this is not the case, as it is very easy in this type to provide internal air circulation.

The shoe brake usually consists of fewer parts of larger size and to this extent has a very decided advantage. On the other hand, it is almost impossible to provide a ready means of adjustment for a shoe type brake without placing a good deal of the multiplying leverage somewhere in the brake linkage instead of at the shoes. This greatly increases the friction in the applying mechanism, which is still further augmented by the friction of the cams used in expanding the shoes, if an internal type is used.

The heavy weight of the properly designed shoe brake is due entirely to the necessity of rigidity and to the fact that where only two shoes are used it is hardly possible to use more than half the available drum surface for friction, about 90 deg. being taken by each shoe. While it is possible to use more circumference, any attempt to do so will make it very difficult to obtain proper clearance between drum and shoes when the brake is released.

To obtain smooth action and long wear from a shoe type brake the drum must be rigid enough to stay truly round and the shoes must also be rigid enough to retain their shape under the maximum pressure used. This can be accomplished only by heavily ribbing both the drum and the shoes. Another reason for the desirability of a rigid drum and shoes is the limited motion and power available for comfortable brake operation. Any spring in these parts must be absorbed before the maximum pressure is reached and is far more serious than spring in other parts of the brake mechanism, because the maximum leverage has been provided at this point.

I have suspected that a good deal of the advantage of a heavily ribbed brake drum is due to its weight and rigidity rather than to any greatly increased area for heat dissipation. The external contracting brake, whether of the band or shoe type, has a distinct advantage over the internal expanding brake in that the braking ability tends to improve over long continued application rather than to decrease. This is due to the expansion of the drum and other brake parts caused by the heat absorbed. Of course, this applies more strongly to the present conventional brake design, where the drum is metal and the friction surface of asbestos fabric or some other relatively poor conductor of heat. My own feeling is that the balance of advantages is in favor of the contracting band brake, especially in districts where the great bulk of travel is on hard surface roads.

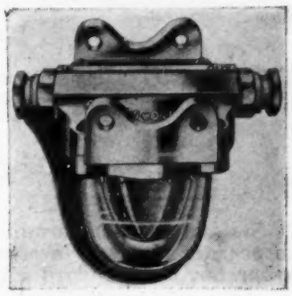
Hard Brake Drums and Linings Desirable

The brake drum, which is ordinarily of steel, should be as hard as is commercially possible and should retain its hardness as far as possible when heated.

Brake lining material should also be close-grained and hard and should have, as far as possible, a uniform coefficient of friction throughout its life. This is highly important on all types of wheel brakes, due to the fact that equalization, even when provided, attempts only to equalize the brake shoe or band pressure. I have found it of considerable advantage in the operation of brake linings to treat them occasionally with oil, with a view to maintaining the binder in efficient shape. I have never seen any asbestos fabric which showed any considerable cohesive quality after being completely dried out by high heat.

New Gasoline Filter

A GASOLINE filter known as the Gas-Co-Later is being manufactured by the Bassick Mfg. Co., this being the latest addition to the Bassick line. It consists of a metal upper and a bowl-shaped glass lower part. Gasoline enters through a pipe fitting on one side, passes down into the glass bowl and is filtered through a chamois while passing upward to the outlet, which is located on the opposite side from the inlet. In order to provide a larger filtering surface in a compact space, the chamois is laid in folds. The bowl can be readily removed for cleaning. With vacuum feed systems the filter is usually connected at the intake of the vacuum tank, while with pressure and gravity feed systems it is inserted in the line from the fuel tank to the carbureter.



Stewart-Warner Starts Production on New Carbureter

Die cast body, throttle at air inlet, arrangement of jet to insure good atomization, and rugged float mechanism are chief features. Design is such as to permit use of system of unit assemblies in production. Manufacturing costs lower as a result.

THE Stewart-Warner Speedometer Corp. has started production on a new, plain tube, fixed jet type of carbureter which carries the throttle butterfly in the air intake instead of above the mixing chamber, as is usual in other makes of carbureters. Placed in this position, the throttle is intended to minimize deposition of liquid fuel particles which results when the mixture is allowed to strike a butterfly plate. Incidentally, this location of the throttle has been found to facilitate inherent metering on account of the variation in the partial vacuum existing above the jet. The air jet in the new carbureter is designed especially to give a high degree of atomization. Due to the comparatively high vacuum existing inside the carbureter on account of the position of the throttle, a stream of air is drawn into the annular space surrounding the base of the air jet and up through the center of the nozzle shown in the sectional illustration. Because of the location of the throttle plate, the smaller the throttle openings at any speed the greater the vacuum.

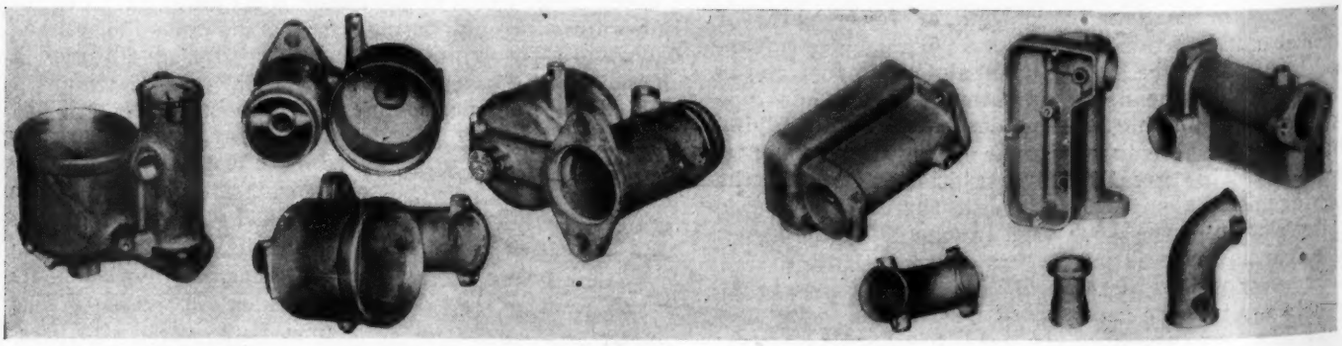
The velocity of the air through the nozzle of the carbureter is high, due to the restricted passage. At average running speeds, it is said to attain a velocity of 1100 ft. per sec. The upper end of the air jet is designed so that it functions similarly to a steam injector, the high velocity column of air rushing out of the nozzle causing a partial vacuum to be applied to the upper end of the fuel metering slot. The fuel is drawn in, atomized by the high velocity air stream and then thrown in a conical shaped column of narrow angle into the manifold. With the manifold design shown, vaporization is completed by the highly heated fins contained in the vaporizer dome.

Fuel is forced through the metering slots by the pressure difference existing between the float chamber and the carbureter throat. Whenever a continuous column of any moving fluid has its velocity increased, due to passing through a second and smaller area, the pressure is decreased by an amount which is proportional to the reduction of area. The greater the velocity of the fluid the greater is the pressure difference existing between two points of different cross-sectional area. This law is applied to govern the metering of this carbureter.

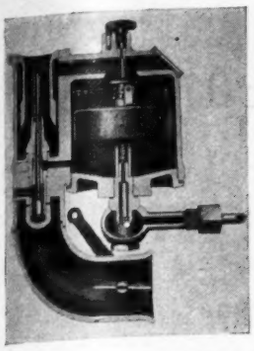
The pressure at a point of relatively large cross-section is communicated to the float chamber through a large equalizing passage, so that the pressure on the surface of the fuel in the float chamber is that existing at the throat entrance. The fuel in the metering box, which communicates with the bottom of the float chamber, normally stands 1/8 in. below the top of the air jet opening. The air pressure existing on top of this fuel column is that existing in the throat. It is the function of this throat to increase the velocity of the air through the cross-section and thus decrease the pressure of the air passing through it relative to the pressure at its entrance.

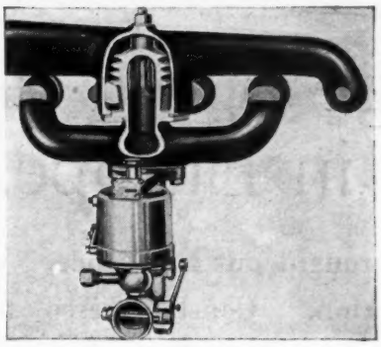
Float Action Described

Therefore, as soon as air is taken in through the carbureter, the pressure exerted on the fuel in the float chamber becomes greater than that exerted on the fuel in the slot. As a result, fuel is forced from the float chamber through the slot and into the annulus, from which point it is picked up and sprayed by the air jet. As the throttle of the carbureter is opened and the amount of air passing through the carbureter is increased, the velocity through the throat must necessarily increase, which consequently increases the pressure difference between the float chamber and the float, resulting in an increased fuel flow. Thus, the fuel flow is entirely automatic and independent of mechanical devices.



Left—Body die-castings used in Stewart-Warner carbureter. These parts require only sand blasting, lacquering and threading, after casting, to prepare them for assembly. Right—New type of throttle housing die-castings used in the Stewart-Warner carbureter, the standard elbow form and a special straight design incorporating a governor mechanism





Left—Sectional view of new Stewart-Warner carbureter. Right—Stewart-Warner carbureting system

A claim made for this carbureter is that it has been so designed that at all speeds and loads at which the throttle is not fully opened, the fuel-air mixture proportions are those that will give maximum economy. It is claimed, however, that when the throttle is opened wide and the engine called upon to deliver its maximum output, the mixture proportions are inherently changed to those that cause the engine to deliver its maximum output.

There is only one adjustment on the carbureter and this is for idling. It consists of an air vent into the float chamber, the size of the vent being determined by the setting of a knurled adjusting screw. When the vent is opened, the pressure in the float chamber is slightly increased and consequently a slightly larger amount of fuel is forced through the metering slot.

As the throttle is opened, the vacuum in the intake manifold decreases, the leakage through the valve guides decreases and also less air is drawn in through the adjusting vent, causing a smaller pressure increase in the float chamber. The increase in the float chamber pressure is directly proportional to the vacuum in the manifold, and as the valve guide leakage is also proportional to the vacuum, the device compensates for any leaning of the mixture due to leakage.

The structural design of the Stewart-Warner carbureter has been arranged so that a system of unit assemblies can be used in its production. That is to say, wherever possible, separate pieces do not mount directly in the body to form assemblies, but are first made up into sub-assemblies. This system reduces the handling to which any part is subjected and results in the convergence to the final assembly of a group of units, each complete and tested. These several sub-assemblies are the primer, the fuel nozzle, the float mechanism and the throttle housing. Each is assembled and tested independently of the other and of the body in which it is finally mounted. After mounting these several units in the body casting, the then completed carbureter is subjected to a test claimed to simulate in every particular the actual operation on an engine, to insure that there is perfect coordination and that the net result is according to specifications.

Design Lowers Production Cost

This system of manufacture is claimed to have advantages other than the purely manufacturing one of facilitating production and reducing its cost. In the case of the float mechanism assembly, for instance, all of the mechanically functioning parts of the carbureter are concentrated into a single unit, capable of very speedy bodily replacement in servicing, with repair and resting done at leisure.

Since the only parts in this carbureter that are subjected to wear and that can get out of order are comprised in the float mechanism, special care has been exercised in the design and in the materials used in its parts. The lever arm ratio is 7.75:1 in this design, which is said to be sufficient to make the mechanism proof against flooding up to a fuel pressure of between 28 and 30 lb. per sq. in. applied to the fuel intake. To insure long life of the float valve and its seat, the former is made of high nickel steel, glass hard, and operates against a seat of hard brass. This combination is claimed to completely eliminate grooving of the valve, said to be the most prolific source of trouble in float mechanisms. The fulcrum pins used in the float levers are made of drill rod; and the float itself is made from cork in 1/8 in. laminations, and is provided with a central guide sleeve of brass. Under the valve is a small spring intended to make the valve follow every least motion of the float, thus insuring steady flow and constancy of level.

In the production of the nozzle parts there are some innovations. The fuel metering orifice is formed as a groove, milled and then shaved to size in the outer wall of the air jet. This latter is a light press fit in the standpipe. This construction is said to insure fuel orifices which are smooth and up to size. It eliminates the need for flow testing. In a carbureter specification all that appears with respect to the fuel orifice is the depth of the groove, a standard width being employed in all cases. It is found that in production to a specification, nozzles made in this way show, in the final test, variations not to exceed 0.50 to 0.75 per cent.

Manifold Sold with Carbureters for Fords

For Ford cars, the Stewart-Warner company is marketing a manifold in connection with the carbureter. The manifold has a hot-spot which is so designed, it is claimed, as to completely vaporize but not to super-heat the fuel and to vaporate the end points of the fuel while keeping the charge temperature relatively low. A manifold is shown sectionally herewith.

Only the fuel in the mixer enters the vaporizer. The air does not do so on account of the fact that the vaporizer is in the form of a pocket open only at the mouth. Vapor formed in the heated chamber flows out over the incoming fuel spray, and gives up a portion of its heat directly to the fuel globules. In this way, the temperature of the vapor is lowered to a definite value, no matter how hot the vaporizer may be. In other words, the vapor, being always in the presence of its own liquid, cannot be superheated. Upon mixing with the air in the intake manifold, the hot vapor causes a rise of temperature above that of the atmosphere. This is claimed to result in an inherent regulation of the vapor temperature.

An installation for lighting by neon lamps has been made at the Coliseum, London. The apparatus is one of the most interesting evolved since the introduction of electric lighting. Neon lighting is carried out by means of glass tubes bent to any desired shape, from which the air has been exhausted and replaced by a small quantity of pure neon gas at a pressure very much below ordinary atmospheric pressure. This neon gas is rendered incandescent by the passage of a high voltage alternating current passing between two metal electrodes fitted at the ends of the tube, the color of the incandescent gas being a peculiarly rich form of flame color. By means of a rotary converter the direct current supplied from the street mains in converted to the alternating current required. In spite of the brilliant illuminating effect obtained on the Coliseum tower—which is a sort of beacon in Central London—it is said that the current consumption is comparatively small. Development work on neon lamps is also being carried on in this country.

New Sliding Change Speed Gearsets Announced in Europe

Lavaud automatic transmission brought out in France. Voisin has purchased rights to invention. Constantinesco torque converter has been developed in England. Both devices have novel construction features interesting to American engineers.

THE sliding change speed gear from its first application to automobiles has been decried as a mechanical monstrosity, and innumerable attempts have been made to replace it with something better, but so far it has withstood all onslaughts. Those whose experience in the automobile field extends back twenty years or more will remember that in the early years of the present century a whole class of transmission devices was invented to which the name variable-throw devices was given.

They consisted essentially of a set of connecting rods extending between a part rotating with the engine crankshaft and a ball or roller ratchet secured to the rear axle or a shaft parallel with the rear axle and geared thereto. Either a rotary or a reciprocating motion was imparted to the forward end of the connecting rods by means of a crank of variable throw, a pair of Stevenson links operated through a pair of eccentrics, or by some similar device. The rear end of the rods had an oscillating motion which was converted into rotary motion of the axle by the ball or roller ratchet.

The advantages of such devices are that they give a practically infinitely variable gear and that the driving torque on the rear axle can be varied without interrupting it for a short period, as is necessary with the sliding change speed gear. The engine can be disengaged from the driving mechanism by setting the mechanism so that the throw of the rods is zero, and if the driving ratchets are fitted directly to the rear axle the device takes the place of the clutch, the usual change speed gear and the final drive. As may be imagined, there were also some serious disadvantages in the devices as built at the time mentioned, or they would have played a more important role in the practical development of the automobile, but of this, more later.

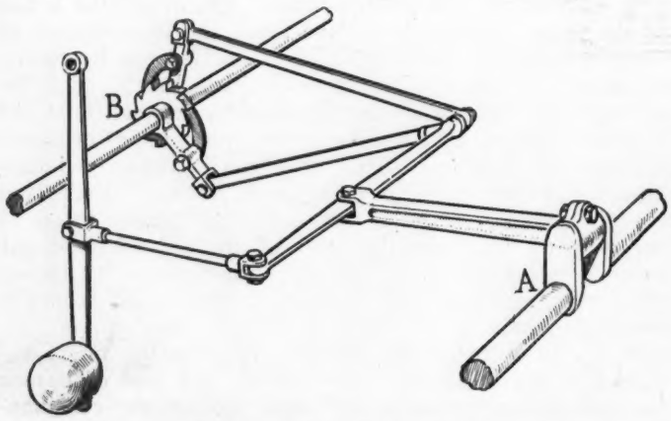


Fig. 1—Diagram illustrating principle of Constantinesco torque converter

By a rather strange coincidence, we received from our French and British correspondents, at almost the same time, descriptions of two new transmission gearsets developed in their respective territories in which the variable throw principle is combined with the principle of automatically varying the transmission ratio by the resistance encountered by the driving wheels. This latter principle also has had its application to automobiles in this country, though not in conjunction with the variable throw principle, an automatically variable transmission of the planetary type having been built by the Sturtevant Mill Co. of Boston in 1904. Following are the descriptions of the new French and English gearsets sent in by our correspondents, and some comment on the new devices is appended at the end.

Voisin Controls Lavaud Device

Voisin has secured control of the Lavaud transmission, by the use of which the ordinary change speed mechanism is abolished and the gear ratio is automatically changed in accordance with changes in the resistance encountered at the rear wheels. It does not appear to be the intention to immediately apply this device to cars delivered to the public, but the Voisin engineers were so impressed with its possibilities that the rights to the invention were purchased and tests will be continued. Various makes of French light cars, and also one Nash, have been on the road during the past year with this transmission, and the results, it is claimed, have been very satisfactory.

By the Lavaud transmission the continuous rotary motion of the engine crankshaft is transformed into a reciprocating motion of connecting rods whose length of stroke is automatically varied by the traction resistance in inverse proportion to that resistance. This reciprocating motion is again transformed into a continuous rotary motion by means of ball ratchets.

In the illustration, shaft A is an extension of the engine crankshaft which, as shown at P, is lozenge-shaped when seen in longitudinal section and a rectangle in a transverse section. The sleeve B, with a rectangular slot, is mounted on the shaft, rotating with it and capable of sliding on it. It is guided in the sliding movement by two pivots, O and S, fixed to the sleeve and moving in the openings O′ and S′ in the shaft A. Two ball bearings mounted on sleeve B carry the plate C, which is concentric with the sleeve. On plate C there are a series of ball-ended posts D, on which are fulcrumed connecting rods E, each one of which has its opposite end G connected to a ball ratchet N. These ball ratchets

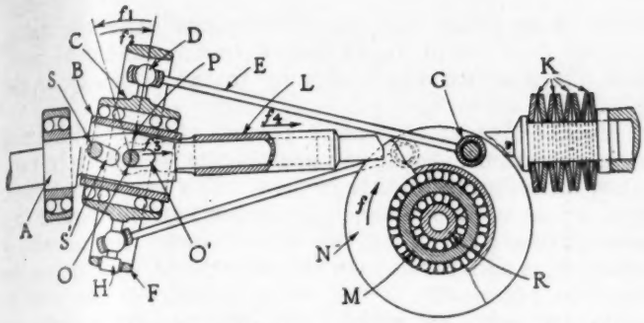


Fig. 2—Diagram of Lavaud automatic transmission

drive the hub M in the direction shown by the arrow f. On plate C are two diametrically opposed trunnions H, pivoting on ring F. This ring is fitted with two other opposed trunnions in a plane perpendicular to trunnions H and pivoting on the fork L. This fork can move longitudinally, but it cannot revolve, and near its end it is provided with a collar against which presses a coil spring or series of spring washers K bearing against the rear axle housing.

Operation Explained

When shaft A revolves it carries with it sleeve B, the axis of which describes a cone around the axis of shaft A. This sleeve performs its conical motion inside plate C, which is prevented from turning by being connected by trunnions H to the ring F; the latter in turn is united by trunnions to fork L, which cannot revolve. This causes plate C to oscillate around the axis O perpendicular to the plane of the figure. This axis O is revolved by the movement of shaft A and, as a consequence, the connecting rods oscillate as indicated by arrows f^1 and f^2, the phase of oscillation of one being displaced relative to that of the adjacent rod.

The oscillating movement being transmitted by each rod to its corresponding ball ratchet N, a series of impulses in quick succession is given to the hub M, and through it to the road wheels.

When the resistance at the road wheels increases, the load on the connecting rods is increased in the same proportion and, in consequence, there is a reaction on plate C. Under this reaction plate C tends to take up a position perpendicular to the axis of shaft A. In this movement trunnion O is moved toward the right of the figure, carrying with it fork L, which, through its collar, compresses spring K. The degree of compression of spring K, therefore, measures, on a convenient scale, the value of the resisting moment which the engine torque must overcome.

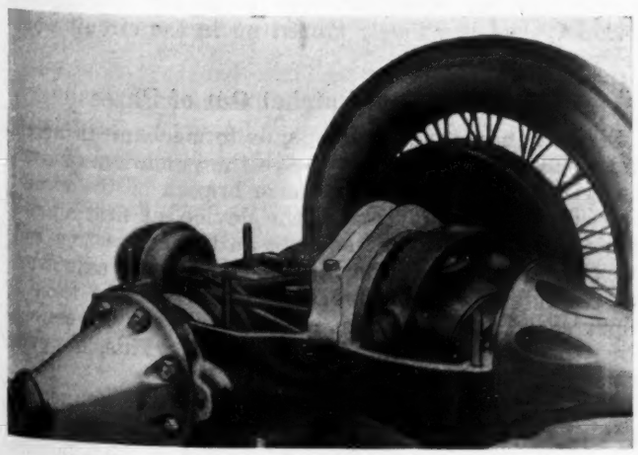


Fig. 3—Lavaud transmission as installed in a car

As the oscillating movement of plate C is proportional to the degree of compression of spring K, it follows that the stroke of the connecting rods is variable and the gear ratio is inversely proportional to the resistance. In climbing a hill the throttle can be set to a given position and as the gear ratio is increased in the same proportion as the rear axle torque increases, the engine torque remains constant and the engine, therefore, will automatically maintain a constant speed.

A novel principle in the transmission of torque recently introduced in England is beginning to create widespread interest and comment. The inventor is G. Constantinesco, who is known also as the inventor of the C.C. synchronizer, widely used during the war for firing machine guns through the propeller of an airplane, so that the bullets passed between the rotating blades.

The diagram (Fig. 1) illustrates the principle involved in the "torque converter," as it has been termed. Taking A as connected to the engine crankshaft and B as the rear axle, the former has a crank and connecting rod coupling it to the center of a crossbar which is linked at one end to a pendulum; at the other end the crossbar is coupled through connecting rods to two

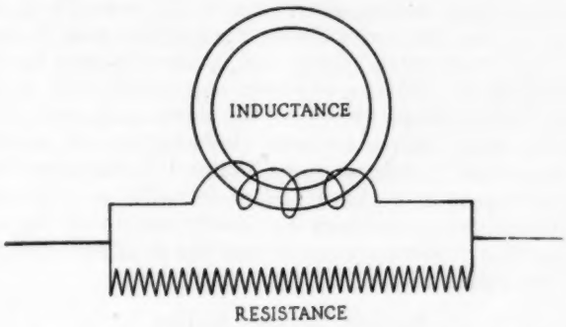


Fig. 4—Diagram of electric circuit with resistance and inductance in parallel

pawls, both taking effect on the same ratchet member secured to the axle.

When A is rotated slowly while B is stationary, the natural resistance of the latter (the car) to movement will cause a slow oscillating movement of the pendulum. But because of the inertia of the pendulum it naturally resists attempts to give it a rapid to-and-fro movement, with the result that when the speed of A is increased (by opening the throttle of the stationary car) there is reaction upon the opposite end of the crossbar. This reaction will overcome the resistance of the car to motion at comparatively low engine speed and the axle B will be slowly rotated by means of the two pawls and ratchet.

With further increase of engine speed the torque converted into reciprocating and back into rotary movement increases, until the pendulum remains almost stationary and practically the whole of the movement of A is transmitted to B.

The illustration is, of course, purely diagrammatic, and in practice the pendulum takes the form of a flywheel which is oscillated; in fact, two equal inertia masses, moving in opposite directions, can be used to obtain better balance. Then, too, the ratchet and pawl gear would not be acceptable as a unit of car transmission, therefore Constantinesco has designed what he terms a mechanical valve, a device that will transmit power in one direction only; this is said to be successful in its purpose, but details of the design are not available at the moment.

The writer has not had a chance to examine any of the

models and working examples of this device, but a representative of "The Motor" (London), which published the first particulars of the mechanism, examined demonstration models of various sizes. One of these, coupled to a 10-hp. (67 cu. in.) light car engine, was installed in the chassis of a 40-hp. car; the latter, with ten adults aboard, was started and accelerated on a gradient of 12.5 per cent, and then from a standing start climbed over 6-in. blocks of wood, placed in front and against the rear wheels, when the engine was accelerated. Subsequently a loaded four-ton truck was hitched to the car chassis and towed, the transmission ratio being automatically changed to take care of the greatly increased load.

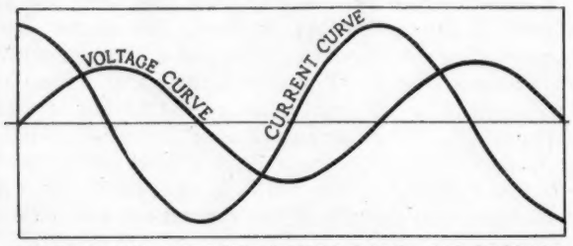
On the test bench the overall efficiency of this torque converter is said to be 97 per cent, and it is claimed that the mechanism need be no larger than a present-day gear box.

Several British papers that carried descriptions of the Constantinesco device waxed exceedingly enthusiastic concerning its possibilities. Thus "The Motor" calls it a "wonder gear," and the "Daily Mirror" speaks of it as "an amazing new mechanism for the motor car." However, since both of the distinctive features of these new transmissions, that of infinite variability and of automatic variation, were known and applied in this country many years ago, it behooves us to assume the well-known Missourian attitude. Both of the devices described are certainly most interesting and clever pieces of mechanism, but there is one obvious difficulty connected with mechanisms of this character, and that has to do with the conversion of the back-and-forth motion of the connecting rods into rotary motion of the rear axle through a ball or roller ratchet or equivalent device.

Earlier Devices Failed

It is the writer's belief that most of the earlier variable throw transmissions failed owing to difficulty with the ratchets. As these ratchets work directly on the rear axle, and at not very long radii, under conditions of heavy traction (high road resistance) they have to transmit very large forces. Owing to the fact that the work of transmission is taken up by one connecting rod after another, the torque impressed on the rear axle can hardly be uniform, and this would tend to further increase the stresses on the transmission members, particularly at low speed, when the car has little momentum.

In a ratchet of the type that has been commonly used, the balls or rollers are wedged in between circular nonconcentric surfaces, and the aggregate pressure on them is much greater than the tangential force transmitted. Of course, by providing a series of balls or rollers, extending all around the ratchet wheel, and dividing the tangential force between them, the stress on the individual ball or roller and on the surfaces with which it engages will be correspondingly reduced. That a considerable number of inventors who tried it failed to make these roller ratchets durable and generally satisfactory does not prove, of course, that it cannot be done, but it bears eloquent testimony to the difficulty of the problem.



VOLTAGE AND CURRENT CURVES 90 DEG. OUT OF PHASE

Fig. 5

Mechanisms of this class permit of very impressive demonstrations. Since the gear is almost infinitely variable, exceedingly high reduction ratios can be obtained, and a car of even moderate power can surmount any obstruction as long as the wheels have the necessary traction or adherence. On the other hand, by closing the throttle practically to the idling point, the car can be driven at very low speed. All intermediate speeds are obtained by simply operating the throttle valve. In this respect variable throw transmissions are somewhat similar to hydraulic transmissions, which also have excellent control features, but seem to have failed to stand up in practice because of difficulty in keeping their packings tight under the heavy pressures necessary to transmit the full engine power at very low car speeds.

An Electrical Analogy

The illustration of the Constantinesco gear being purely diagrammatic, it is impossible to know in what way he has tried to solve the problem of converting the reciprocating motion of the connecting rods into rotary motion of the rear axle or differential drum.

Constantinesco calls attention to the fact that his gear is a mechanical equivalent of an alternating current electric circuit containing resistance and inductance in parallel (Fig. 4). The inductance branch of the circuit always contains some resistance also, but considering this to be small, an enormous current would flow through the inductance side if a direct electromotive force were applied to the circuit, owing to the fact that inductance does not affect direct currents. When an alternating electromotive force is applied to such a circuit, not only is the current in the inductive branch greatly reduced, but the current that does flow represents practically no power. This is due to the fact that the electromotive force and the current are out of phase (Fig. 5). The current reverses much later than the electromotive force, and when the latter has attained its maximum value the current is still practically nil. If it were possible to construct an inductive circuit entirely without resistance, then the current in this circuit would lag exactly 90 deg. behind the electromotive force and would represent no power at all. When the electromotive force had attained its maximum value in one direction the current would just begin to flow in that direction, and when the current had attained its maximum value in that direction the electromotive force would change its direction. Half the time the current, therefore, would flow in opposition to the electromotive force, and during this period energy previously stored up in the circuit would be returned.

Pendulum and Ratchet Out of Phase

Electric inductance corresponds to mechanical inertia, and in the Constantinesco device the pendulum or oscillating flywheel is the inductance branch of the circuit. Referring to the diagram of the device, at first sight it would be supposed that as long as the connecting rods exert a push through the ratchet on the rear axle drum, the pendulum would move to the rear, as the force is imparted to the lever arm midway between its connections to the ratchet and the pendulum. This, however, is not the case.

The reactions between the lever and the connecting rods at its opposite ends will always be equal. If the lever pushes against the connecting rod to the pendulum at B, in the direction toward the pendulum, and the

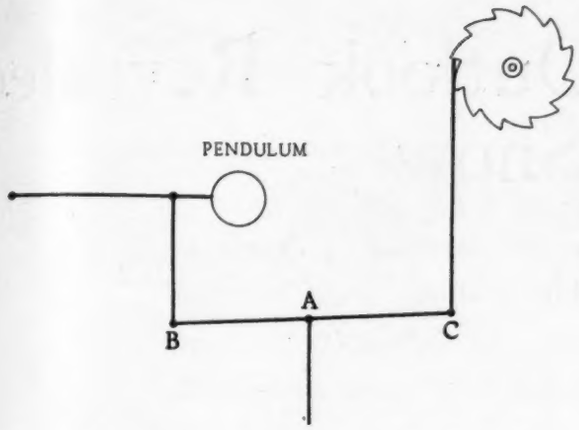


Fig. 6—Diagram of Constantinesco device

pendulum moves in the same direction, then energy is stored up in the pendulum; it is being accelerated. With the pressure in the same but motion in the opposite direction, energy is given out by the pendulum.

The reaction between the pendulum and the lever connected to it is a maximum when the pendulum is at either extreme of its swing, because its speed is then zero; that is, it has been rapidly decelerated and now begins to accelerate in the opposite direction. Somewhere between the two extreme positions the bob moves at its maximum speed, and its acceleration is then zero. This latter point of maximum speed of the pendulum corresponds to the beginning and end of the stroke of the pawl, while the extreme positions of the pendulum correspond to mid-stroke of the pawl.

Pendulum Varies Effective Gear Ratio

The pendulum stores up energy during that portion of its swing from its extreme position to the position of maximum speed, for increasing its speed means increasing its store of kinetic energy, and this energy, of course, comes from the engine. During the remainder of the swing, away from the position of maximum speed, it gives out this stored energy again, returning it to the system and therefore helping to turn the rear axle. In the extreme position the pendulum is stationary for an instant and therefore has no kinetic energy left.

It may not be obvious just how the pendulum acts to vary the effective gear ratio. This may be explained by reference to Fig. 6. If the end B of the lever were stationary, then the motion imparted to point C would be just twice that of point A, and the force at point C would be half that at point A. If the force required at C (to drive the car) is small, the speed is high and the pendulum is very heavy, then it is obvious that the amplitude of swing of the pendulum will be very small, since both the force tending to accelerate it and the time of its application will be small. Point B is then nearly stationary and the relations of the forces and of the motions at A and C are then as described above. Now suppose the opposite conditions to exist. That is, the force required at C (to turn over the rear axle) is great and the speed low. Then, since the accelerating force on the pendulum is great and it acts during an appreciable period, the pendulum will be set into swinging motion of much greater amplitude. Point B will then have many times the motion of point C, and since the pressures at both points are equal, nearly all of the power delivered by the engine during a certain phase of the swing of the pendulum (the first or inward portion of the swing) will be stored up in the pendulum. This energy will practically all be returned during the last or outward portion of the swing, being delivered at point C, and as C moves only a very short distance, the pressure at that point, or the force transmitted through it, will be very large.

New Means of Regulating Charge Rate of Batteries Developed

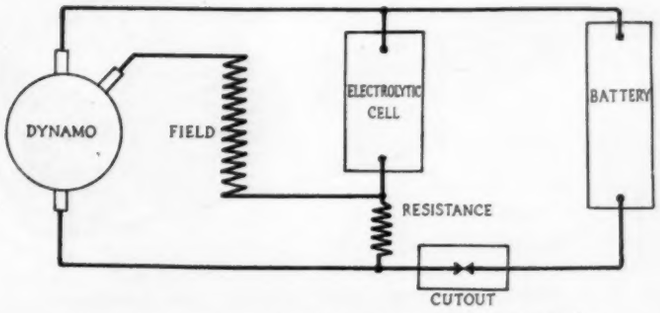
THE British Lighting & Ignition Co., Ltd., which was founded during the war by the Vickers and Wolseley companies to take over the Bosch interests in England, has introduced a new means of regulating the charge-rate of the batteries of automobiles.

In the B. L. I. C. lighting equipments the regulator is used in conjunction with a third-brush generator and supplements the usual automatic cut-out device. It consists of a number of small sheet-steel compartments containing sheet-steel plates immersed in an alkaline solution. The steel plates are connected in positive and negative groups and the groups of plates in the various compartments are joined in series. In a regulator for governing a 12-volt there are six compartments. When current is sent through the regulator the water is decomposed, which process requires two volts, so that six such cells in series require a pressure of 12 volts.

The regulator is connected in parallel with the battery. If the battery voltage is below 12 (in the example cited) it is less than the back electromotive force of the regulator, and all the current generated goes to charge the battery. But when the voltage of the latter rises above 12 the regulator absorbs some of the current from the generator, to an extent increasing with the battery voltage, until, when the battery becomes fully charged, practically all the current is diverted through the regulating cells.

Novel Action

But the scheme goes further than that. With the normal third-brush equipment the output of current from the generator rises almost in proportion to the battery voltage and vice versa, thus encouraging overcharging of a full battery and undercharging in one that has heavy calls upon it. But with this regulator the current generated with a high battery voltage is actually less than at low voltage; moreover, the major portion of this reduced output is diverted into the electrolytic cells, thus leaving only a small "milking" charge for the battery. This reduction in output at high battery voltage is due to the use of a resistance in series with the electrolytic cell and field coil, as shown in the accompanying diagram. At high voltage the resistance carries a larger current; this causes a greater voltage drop, which is subtracted from the voltage across the field coil, so lowering the field current and thus reducing the generator output.



New means of regulating charge-rate of batteries

Bright Commercial Outlook Revealed at Paris Show

French firms have increased production facilities. Prospects for better business are good. Exhibition shows large increase in number of overhead valve engines. Great variety in four wheel brake mechanisms. Engine lines have been simplified.

By W. F. Bradley

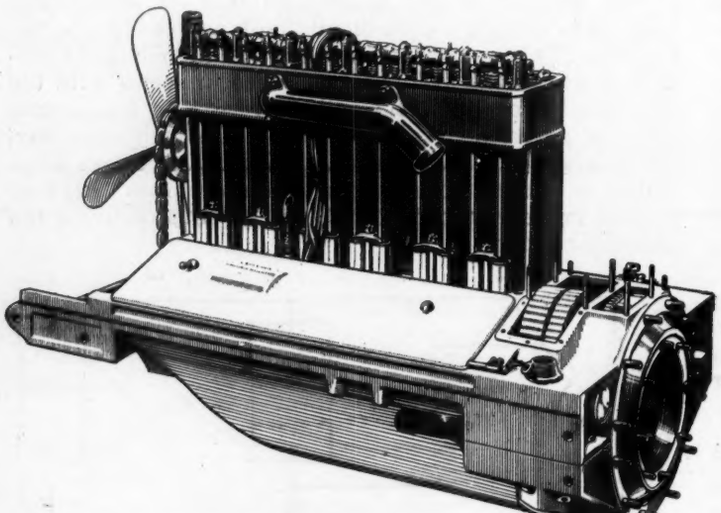
OPTIMISM was the dominating note at the French automobile show, held in the Grand Palais, Paris, from Oct. 4 to 14, and followed by a second exhibition for commercial vehicles only from Oct. 24 to Nov. 2. The home demand is strong and export business is growing, with the result that the past year has shown a record production and all indications point to 1924 and 1925 being on an even more satisfactory scale. With the exception of a small number of firms in difficulties by reason of poor financial management, growth is reported everywhere.

Citroen has planned an expenditure of 25,000,000 francs during a period of twelve months for additional machinery and factory buildings. Two-thirds of this amount is being spent on American machine tools, the installation of which has already begun, and the rest is for buildings and machinery purchased in Europe. Delage increased his output 30 per cent in each of the last two years and predicts the same increase for both 1924 and 1925. Unic has purchased a new factory which will enable it to double production. Hotchkiss is negotiating for the purchase of works twice the size of its present factory. Talbot-Darracq reports that with an output of ten per day it is 400 chassis behind on delivery. Mathis is adding 500,000 sq. ft. of floor space to his factory at Strasbourg. Renault has placed the biggest orders for raw material and supplies on record. These few examples are typical and may be taken as an indication of the healthy condition of the French industry.

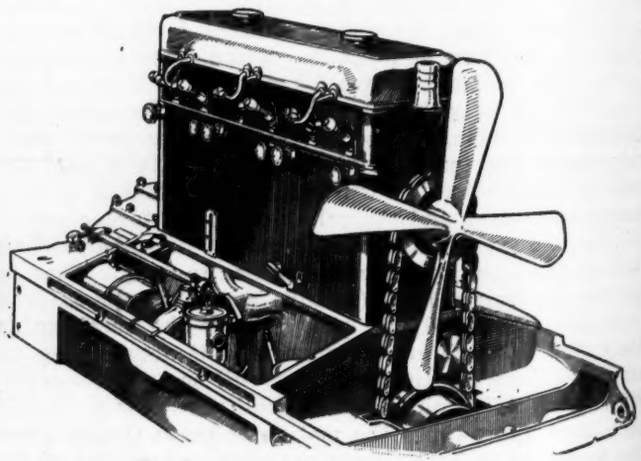
Dealers throughout the country report a strong demand for all classes of cars, and particularly for cheap and medium priced models. For the first time the farming classes are buying readily. This may be attributed partly to the good harvests and partly to propaganda which is now beginning to bear fruit. The home industry is facilitated by reason of the absence of foreign competition. Italy is the only nation in a favorable position for selling on the French market, and her big production is limited to one firm. England is shut out by exchange rates, Germany by high import duties, and America cannot do much business with the dollar at 17 francs. Ford assembles on the French market, and although having a price advantage is meeting with serious competition from such firms as Citroen, Renault and Berliet, with models more suited to local conditions.

Exchange Rates Help Business

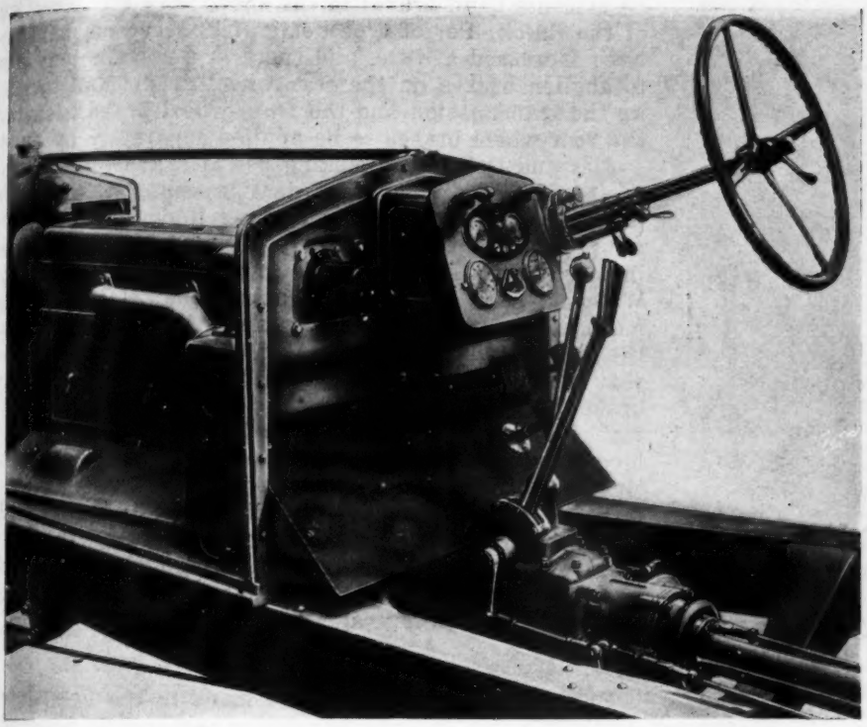
Exchange rates give France an advantage on most foreign markets, with the result that an increased volume of foreign business is being transacted. The improvement in this direction is not uniform throughout the industry, for while some report 50 per cent increase in foreign business others are stationary. This is attributable primarily to differences in commercial efficiency, and secondarily to the greater or less suitability of types for export business.



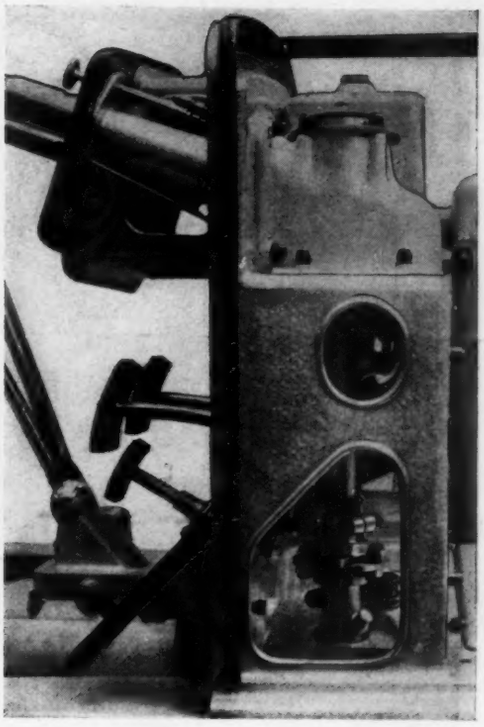
Fiat six-cylinder engine with chain drive to camshaft at rear end. Covers are removed, thus showing pushrods and rockers. A detachable aluminum plate encloses water pump and magneto



New six-cylinder overhead valve Fiat with crankcase cover removed showing oil filter, carbureter and starter



Detail of telescopic steering column on six-cylinder Fiat



Fiat telescopic two-stage steering gear mounted on dash

An increase in price varying from 5 to 10 per cent was marked throughout the industry during the first week of the show. By inspired newspaper articles it has been sought to prove that the cost of automobiles in relation to the price of wheat is less than in 1914, and that the increases are justified by reason of exchange rates and the consequent increase in the cost of raw material.

French Dominate Home Market

The fact remains, however, that the French industry has no competition to fear on its home market and that the increases have been decided on because it was felt that the buying public would stand for them. This is shown by the hesitancy of the great majority to make a change in prices until a definite lead had been given by a few important firms and that prices for export business have not varied. Dealers generally declare that the 5 to 10 per cent increases have had no influence whatever on sales. Buyers are paying much more attention to State taxes and to the possible increase of these than to a difference of a few hundred francs in initial cost.

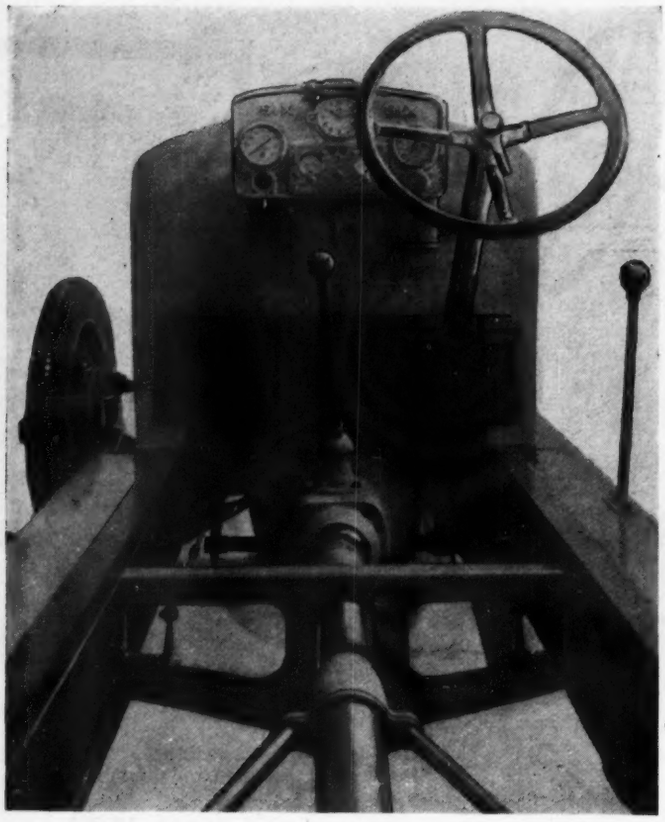
Gasoline costs also play an important role. There is a Government project afoot to increase State taxes and if carried out this undoubtedly will have a very prejudicial effect on the industry. The condition of the country is now such that the State would gain by decreasing instead of increasing automobile taxes. This argument, which did not hold good before the war, is now being put forward in a very convincing manner.

Technically this year's show reveals little change over the exhibition of 1922. The tendencies which were first revealed in 1920 have now reached their full development and no new developments have come in to change the lines laid down three years ago. There are less than one dozen entirely new chassis at the show, but there is an immense amount of detailed improvement, with more variety than can be found among the automobile products of any other nation in the world. Speaking broadly, there are four main divisions, as follows: the cheap 10-hp. model four-seater, selling between 15,000 and 16,000 francs, the leading producers of which are Citroen and Renault; the medium class 12- to 15-hp. model, with an engine of about 122 cu. in., selling price for the four- to six-seater being between 28,000 and 35,000 francs; the high-class 20- to 30-hp. model, selling around 50,000 to 55,000 francs with open body, and the luxury type, nearly always sold with custom bodies. No maker is limited to any one of these classes. Renault is represented in four of them; Citroen in two divisions; Delage is in three of them; the majority are found in at least two of these classes, either a cheap and a medium, or more often a medium and a high-grade class. The only maker exclusively in the luxury class is Farman. Hispano-Suiza, who bid for this class of business after the war, has decided to get into the medium class also.

One of the outstanding technical features of the show is the Sainsaud de Lavaud transmission, for which the Voisin Company holds the world's rights for application to automobiles. It is admitted by the Voisin engineers that this transmission is not quite ready for putting into the hands of the public, but it is claimed that the difficulties are minor ones which can be overcome in six months. The change is revolutionary, for it entails the abolition of the gearbox and present types of final drive and gives a car which automatically selects the final gear ratio according to the resistance encountered by the road wheels. In addition to its automobile use, there are immense possibilities for this transmission on rail vehicles for it gets over the difficulty inherent to the internal explosion engine of starting away with very heavy loads.

Four Chief Mechanical Features

There are four main technical features in the show: Brakes, overhead valve engines, refinements, and balloon tires. The brake situation has been consolidated, for at the present time Citroen is the only maker in France who does not fit front-wheel brakes to any of his models. The reasons for this are the difficulty of



The "Six" chassis, a new small one built in Strasbourg. Note propeller shaft going through frame cross member

applying front-wheel brakes to the type of front spring adopted by Citroen, the fact that the cars are built to a low price, and the big production methods which make any radical change difficult and slow.

It is worth noting that there is not a single firm on the Continent of Europe endeavoring to justify the non-adoption of front-wheel brakes on some of its models by arguments such as have been brought forth in America. Instead of trying to find technical objections to this system of braking, the few not using it confine themselves to the statement that their existing brakes are sufficient for the size and weight of their car, or they try to offset their disadvantage by a price advantage.

It is worth noting that a few of the strongest supporters of front-wheel brakes are beginning to voice the danger of over efficiency in retardation. Four-wheel brakes are so powerful on some of the high-grade cars that tires and spring attachments suffer.

Only One Renault Without Four-Wheel Brakes

Renault is now applying four-wheel brakes to all his models excepting the smallest, a 2-3 passenger car of 58 by 90 mm., with a wheelbase of 96 in. One of his biggest selling lines, a four-cylinder of 75 by 120 mm., with wheelbase of 110 in. and four-passenger body, is now built with a four-wheel brake system. Berliet has also come on the market with a popular type four-passenger car, four-cylinder overhead valve engine of 60 by 96 mm., wheelbase 110 in., fitted with four-wheel brakes and selling at 16,500 francs. This move undoubtedly will give these two makes an advantage in their competition with Citroen, the biggest producer on the French market and the only one not yet producing front-wheel brake cars.

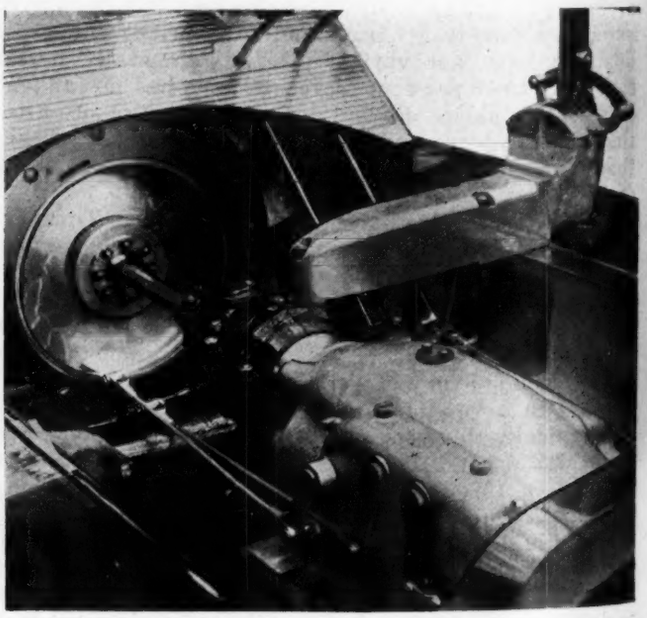
While there is uniformity in general lines, details of brake application reveal plenty of variety. There are no external band brakes in the show, with the exception of the Buick; Perrot type dominates; servo mechanisms have increased a little, and there is a certain tendency to abolish brakes on the rear wheel drums and to link up the transmission and the front-wheel brakes, leaving the rear-wheel brakes to be applied separately by hand.

Fiat and Delage are making use of a hydraulic servo-mechanism having a great deal in common, and both being mounted on high-grade six-cylinder models. Renault has adopted a band type of servo-mechanism inclosed on the left-hand side of the gearbox. Chenard-Walcker and Bignan are using the Hallot servo-mechanism and automatic regulator, the brakes being on the transmission and on the front, with no drums on the rear wheels. Cottin-Desgouttes is original in having two brake pedals, one operating on front and rear simultaneously and the other on the transmission; the hand lever gives separate control to front and rear sets simultaneously. The Sizaire Brothers are using an internal band type brake with cable control throughout, the anchored end of the single cable being the only point of adjustment. For the vast majority brakes are applied simultaneously front and rear on equal size drums with equal leverage for both.

Overhead Valves Increase in Popularity

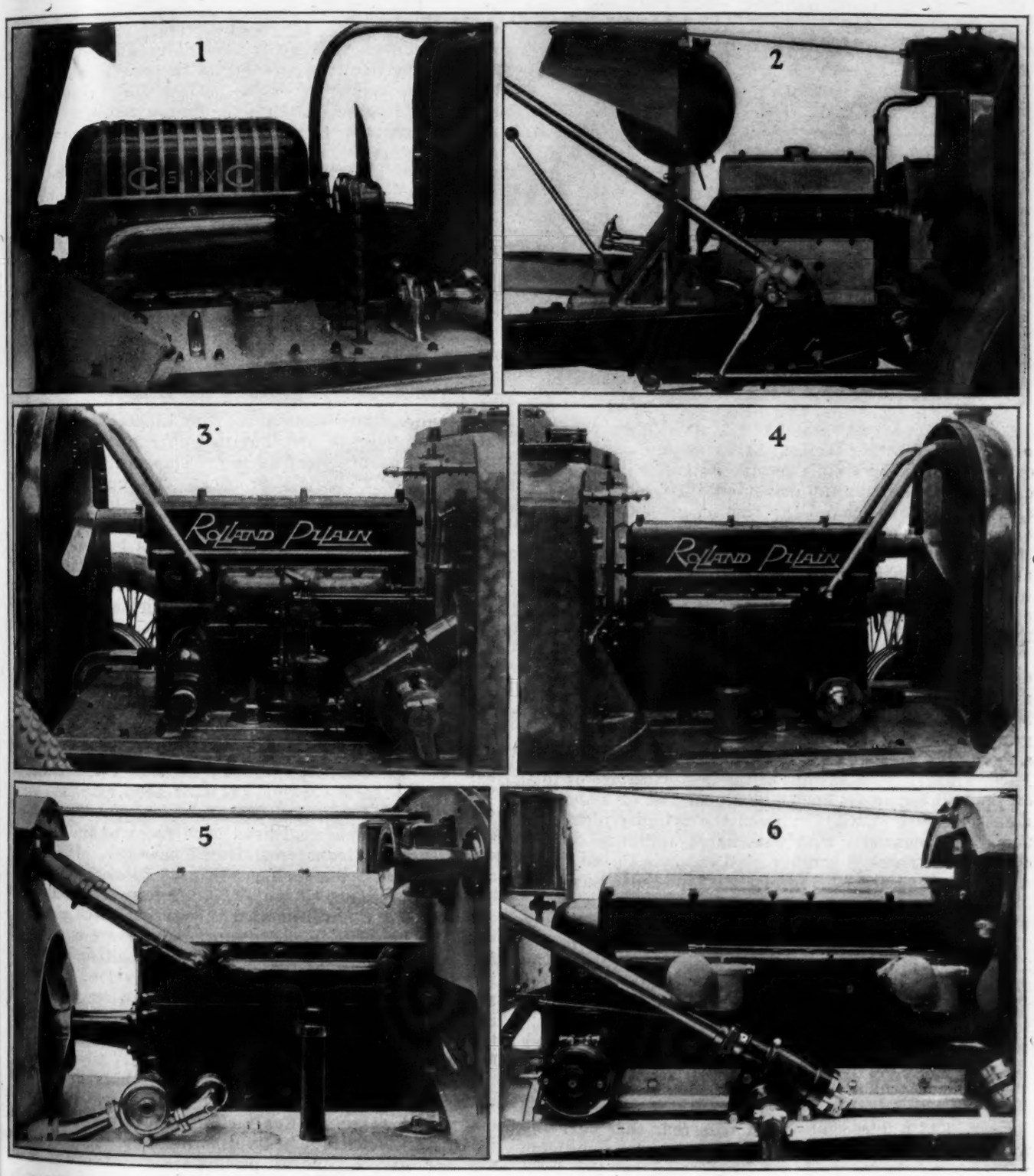
Enormous progress has been made in the number of overhead valve engines, for all the new models produced have this type of valve, while many of last year's models have been modified to overhead valves on the old-type engine base. It is difficult to find a new model engine with the L-head. Where production costs figure prominently, side by side valves hold their own, the most important examples being Citroen and Renault. Berliet, however, has come on the market with a cheap type having valves in the head; Delahaye has changed to this type; Delage and Talbot-Darracq have abandoned the L-head; De Dion Bouton is producing very few of this type for passenger car service; Peugeot is now making two types with valves in the head.

Operation by pushrod is in a majority, the overhead camshaft only being used where cost is not a matter of primary consideration. There are no examples of external pushrods, while in most cases the inclosing is so neatly done that it is difficult to tell from an external

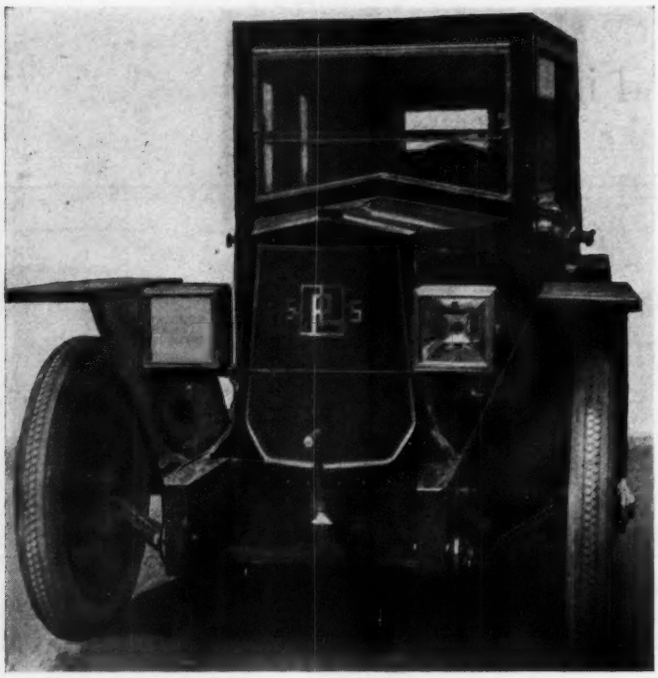


Gearbox on front end of torque tube is now a feature of all Renault models

New Engines Show Trend in French Design



1—This new 2½ by 3½ in. "Six" has the carbureter at the rear of the block. Spark plugs are enclosed and are cooled by air flowing to the carbureter. Note inclined dash and overhead inspection lamp. 2—Mathis four-cylinder pushrod overhead valve engine. Note mounting of brake shaft through engine support. 3—This Rolland-Pilain is a good example of prevailing practice of slab-type crankcases. 4—Rolland-Pilain slab-type crankcase. Note fan driven off end of camshaft and battery boxes dropped in dash. 5—Four-cylinder overhead valve Vermorel has fan driven off vertical shaft by bevel friction gear. 6—Eight-cylinder vertical Chenard-Walcker with vertical shaft drive at rear and generator and magneto placed crosswise



A cubist body on a Panhard chassis

examination whether the camshaft is in the base chamber or on the top. The Mathis and the Rolland-Pilain present examples of radiator fan driven off the front end of the camshaft. On some of the smaller models there are examples of magneto driven off the camshaft, and when this is accompanied by a one-unit generator and starter and thermo-syphon cooling without fan, very simple external lines are secured. Vermorel, on a new overhead camshaft engine, drives the fan by bevel friction from the vertical shaft operating the overhead camshaft.

There is a growing tendency not only to inclose the engine accessories but also to simplify engine lines by extending the crankcase webs right up to the frame members. This was limited a couple of years ago to high-grade models, but it is a practice which is now found on some of the cheaper cars, as witness the new Berliet at 16,500 francs. Fiat has one of the best examples of this, on the high-grade six known as Model 519, on which the accessories are in wells between the cylinder block and the frame members, with detachable aluminum covers over them. There is another good example in the "Six," a new job designed by a former Hispano-Suiza engineer, built in Strasbourg, and marketed by the Charley Brothers, who in the early days were very prominent in placing the Mercedes on the French market. On this 2.56 by 3.54-in. six-cylinder engine the crankcase is extended right up to the top of the frame members and also up to the radiator by a detachable plate with openings for the fan belt. The carbureter is at the rear of the cylinder block, but the air inlet is at the front end, the current of air passing over the spark plugs, which are inside the detachable housing hiding the valve pushrods. This car has an aluminum dash with the top sloping forward and a telescopic tube on its rear face carrying the aluminum instrument board. An inspection lamp with a big reflector, mounted on the front of the dash, illuminates the entire engine.

New Dash on Rolland-Pilain

Rolland-Pilain has a new dash arrangement forming an airtight connection with the slab-top engine base, and inspection lamps on the front of it to left and right of the engine. Two battery boxes are recessed in the hollow dash; they are visible from the driver's seat and are lifted out from under the hood. The fuses are in a special compartment between the two battery boxes.

Full pressure lubrication through a hollow crankshaft has gained considerable ground. On two of the new Chenard-Walcker models a modified type of dry sump lubrication is used, with two oil pumps, mounted on one shaft. The aluminum underpan, the full length of the engine, forms an oil radiator. One pump is used for passing the oil through the radiator and the other for distributing it under pressure to the bearings. The design makes splash impossible. On a new Vermorel, designed by Engineer Gremillon, formerly of the Peugeot racing department, two oil pumps are used, one delivering to the main bearings and the other to the overhead valve gear, thus allowing different pressures to be maintained for these two parts. Delage is also using two pumps on a high grade six, one of these draining the engine basechamber and filtering the oil, and the other delivering it under pressure to the bearings. The influence of racing can be seen here, but it has not been thought necessary, as on pure racing cars, to make the oil reservoir entirely independent of the engine.

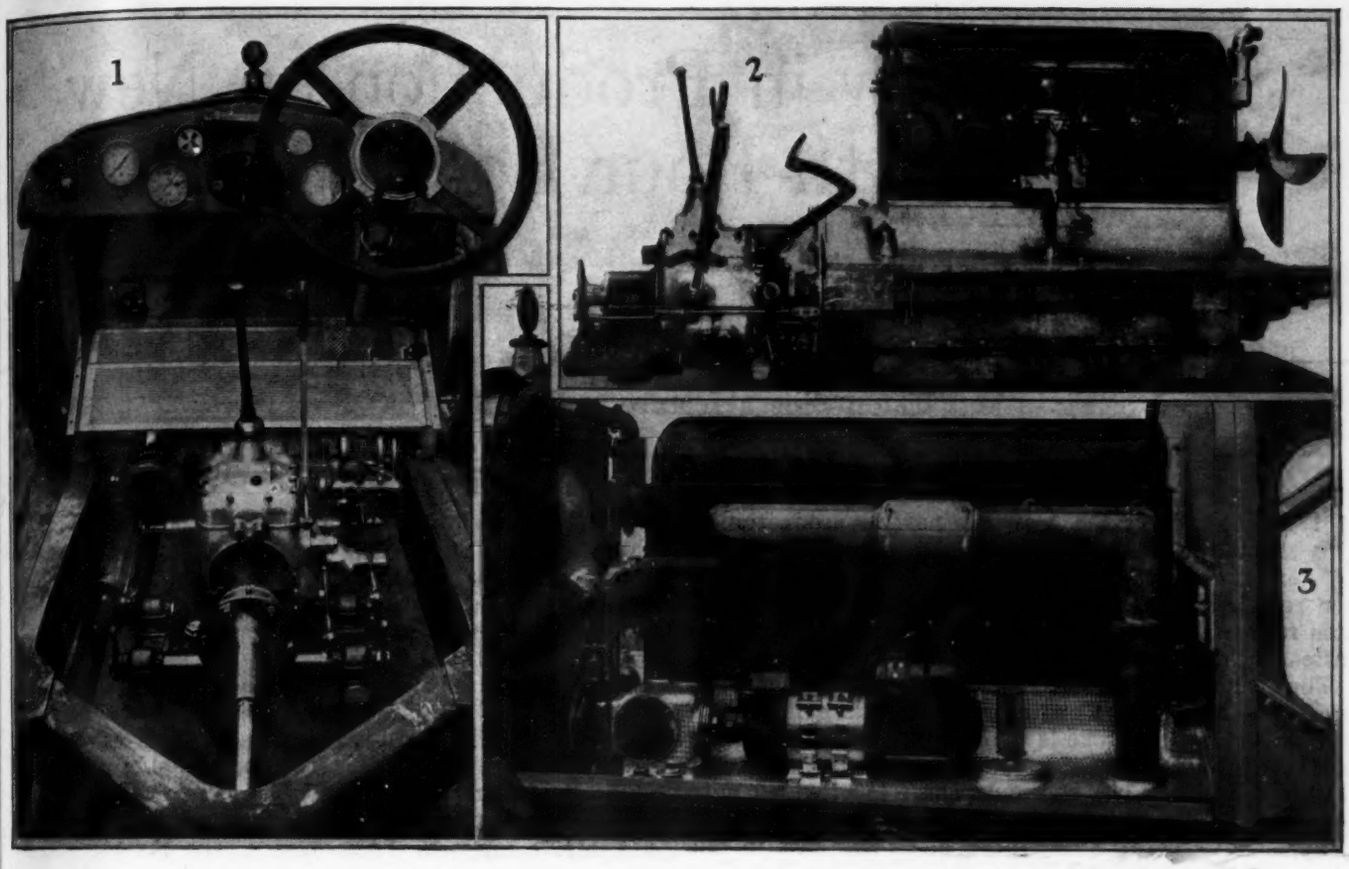
Fiat has adopted a new type of two-stage steering gear with a telescopic steering column inclined at 19 deg. to the horizontal. The steering gear box is mounted on a cast aluminum dash bolted to the main frame members and connects by a vertical shaft and flanged couplings to the main steering arm having spherical connection to the fore and aft steering rod. This design places the whole of the steering gear back of the engine and permits of a very considerable inclination of the steering column. In addition, the shaft on which the steering wheel is mounted being telescopic, can be pushed right down to facilitate entering or leaving the driving seat and it can be locked in three different positions by means of a hand lever. The gas and main jet controls are on the top of the main column, only the ignition lever being on the steering wheel.

Renault Gearbox Location Changed

The only important technical change made by Renault is the placing of the gearbox on the front end of the torque tube. This has been done for some time on the two small models, and also on the new Paris taxicabs, but it is a feature which has now been extended right through the Renault models, from the smallest to the biggest. The spherical head is in front of the gearbox, carried on a transverse frame member. Diagonally mounted cantilever springs are used in all cases.

Balloon tires are shown by 29 different makers. While a few of these have adopted this type of tire as standard, the majority make it optional, at an extra cost. Michelin is the only maker producing balloon tires and is marketing them in three sizes: 715 x 115, 730 x 130 and 775 x 145. Manufacturers generally let clients decide which type of tire they will take. Special rims have to be used for these low pressure tires and Michelin steel disk wheels always go with the "comfort" tires.

This year's show clearly indicates that the average piston displacement is on the down grade, and, in the opinion of leading Continental engineers, this tendency will continue. Even when not making this type of car, engineers predict that we are coming to the 122 cu. in. engine for the great majority of cars, bigger piston displacements being reserved for very costly models. The position of the four-cylinder engine has been strengthened. The eight-cylinder V type has died out, all the makers producing it after the war having now abandoned it. On the other hand, there is a slight tendency towards the small straight eight, one of these being shown this year by the Chenard-



1—*Center of Delage chassis.* 2—*Complete powerplant, intake side.* 3—*Delage engine, exhaust side*

Walcker Company. More pronounced is the move towards the small six having a piston displacement not exceeding 183 cu. in.

This year marks the complete break away from the L-head engine by Delage, a move which may be taken as typical of advanced tendency in France. The 30-hp. six-cylinder model brought out directly after the Armistice has given way to an overhead valve job in the original chassis, and the small four, produced two years ago to meet the demand for more economical motoring, has this year had its engine changed to an overhead valve model with a five-bearing crankshaft.

In addition to these two, which will constitute the main selling lines of the factory, Delage has brought out a bigger, very high grade six-cylinder chassis with which he intends to compete on the world's high class market. With a wheelbase of 153 in. and a length of 118 in. available for the body, the chassis receives a saloon body with six pullman chairs facing forward. Although the frame members have a depth of 7¼ in., the engine is a six-cylinder of 3.74 by 5.51 in., and the tires fitted are substantially 35 x 5.3 in., the total chassis weight, in running order, has been kept down to 3050 lb.

The main technical features incorporated in this design are a seven-bearing crankshaft with circular webs; thermostatic control of both water and lubricating oil; an overhead valve gear with automatic adjustment between cam and valve; a modified type of dry sump high pressure lubrication; big capacity expansion chamber interposed between the exhaust manifold and muffler; application of a hydraulic servo-mechanism to the four-wheel braking system.

Valves Are Mounted Vertically

The valves are mounted vertically in the head and are operated from an overhead camshaft driven by vertical shaft and spiral bevel gearing passing through the forward portion of the cylinder casting. The seven main bearings have white metal-lined steel caps with a considerable thickness of steel, steel being preferred to aluminum for the reason that the latter, because of its greater coefficient of heat expansion, tends to contract on the crankshaft in cold weather, and to bind it. There is no oil in the main basechamber, all the lubricant being contained in a cast aluminum oil tank under the engine and two pumps being used, one of these emptying the basechamber and filtering the oil and the other delivering the lubricant under pressure to main bearings.

Special Zenith Carbureter on Delage

A special double Zenith carbureter is used. The air intake is heated by a muff from the exhaust manifold and the crankcase breaker is also led up to the carbureter.

An entirely new front axle has been designed for the front wheel brake system. It is of I-section between the springs and of oval section, merging into a hollow circular section from the spring seats outwards. The ribbed aluminum brake drums have a diameter of 16.7 in. For the first time Delage uses a hydraulic servo-mechanism consisting of a pump driven off the main shaft and delivering the gear box oil to four pistons—one for each brake. There is a fine gauze filter between the gearset and the servo housing to prevent metal particles getting into the oil passages. With this design the length of the brake rods is reduced to a minimum and no adjustment is provided on the rods themselves. There is one main adjustment on the brake pedal shaft and four points of adjustment by varying the angle of the brake cams at front and rear. If for any reason the servo-mechanism should go out of commission, the front wheel brakes can be applied mechanically through the pedal. The rear pair has independent hand control.

Sterling Now in Production on New Chassis with Four Body Models

Rubber shock insulators used at both ends of all springs. Chain layout is triangular and adjustment is made by worm and worm wheel from outside cases. Pressure lubrication to all crankshaft bearings and piston pins a feature. Wheelbase is 125 inches.

STERLING Knight chassis are now in production at the Warren, Ohio, plant. Features of the present chassis include a six-cylinder Knight engine, Timken rear axle and a spring suspension which incorporates rubber shock insulators at both ends of all springs instead of the conventional pin type shackles.

The Knight engine, developed by J. G. Sterling, vice-president in charge of engineering, has six cylinders of 3¼-in. bore. The stroke is 4⅝ in. The sleeve operating mechanism does not differ radically from conventional Knight practice. The eccentric shaft is provided with seven bearings.

Upper crankcase and cylinder block are cast in one piece. The intake manifold is provided with a hot spot. Piston pins are fitted snugly into the cast iron piston bosses and the bearing is on a bronze bushing in the upper part of the connecting rod. Oil is fed to this bushing through a steel tube attached to the web of the connecting rod.

Connecting rods are heat treated steel forgings, with the babbitt bearings cast directly in the big ends. No shims are employed.

Sleeve valves are said to be lighter than is usual in this type engine. Both the inside and outside surfaces are ground to close limits. The crankshaft has seven bearings. Main bearings are 2½ in. in diameter and the crank pin bearings 2⅛ in. Each of the seven main bearings is oiled by a separate lead. Cranks are drilled so that each rod bearing is oiled from the adjacent main bearing. The seven bearings of the eccentric shaft are also oiled by seven separate leads.

Oil for the entire system is circulated by a gear-driven pump located inside of a screen in the bottom of the crankcase cover. The screening surface is exceptionally large and is accessible for cleaning from the bottom of the oil pan without disturbing the pan.

Due to the seven bearing design it is possible to bridge the crankcase at seven points and thus obtain a stiff structure. The engine is supported in the chassis at four points and the bridging of the crankcase, together with other structural features are said to prevent weaving.

Front end drive on the engine is by short Morse chain in a triangular layout. The sprocket driving the auxiliary shaft is adjusted by a worm and worm wheel mechanism which can be operated from outside the engine while the engine is running. The generator drive is so arranged that the generator itself can be removed without interfering with the running of the engine.

Westinghouse Electrical Units Used

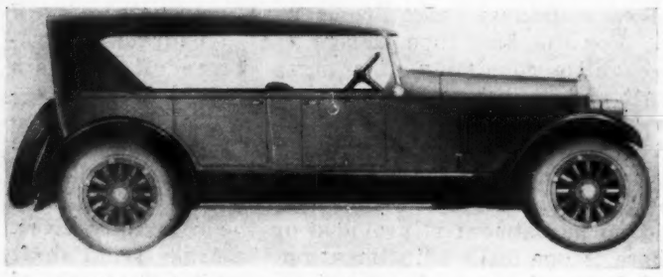
Electrical equipment is Westinghouse 12 volt and includes a two-unit starting and lighting system. Thermosyphon cooling system is used.

The multiple disk clutch has nine disks. With gear teeth on both driving and driven disks. Adequate provision is made for oiling the throwout bearing from the interior of the gear case. The gearset is of the conventional three speed type, the gears being finished by grinding. Drive from the gearset to the rear axle is through a tubular propeller shaft with flexible disk universals. The engine is set at a slight angle so that the normal drive is in a straight line.

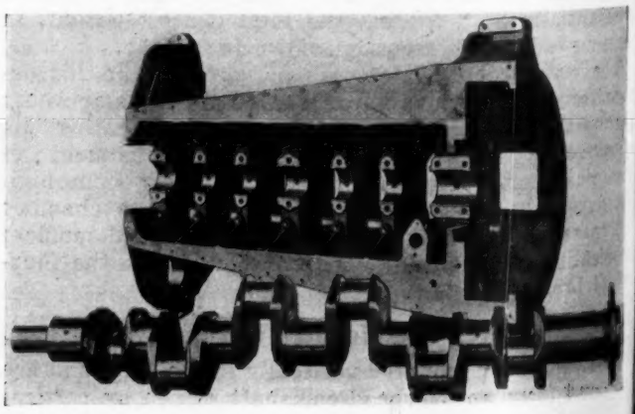
A Timken rear axle is employed. Rubber shock insulators, used instead of conventional shackle and shackle pins, are located at each end of both front and rear springs.

A worm and worm wheel steering gear is fitted. The steering wheel is walnut and short spark and throttle controls are used.

Wheels are artillery type fitted with 32 x 4½-in. cord tires. Brake drums are 15½ in. in diameter. The wheel-



Above—Five-passenger phaeton illustrates trim body lines



Right—Seven-bearing crankshaft and crankcase. Note heavy webs at each bearing

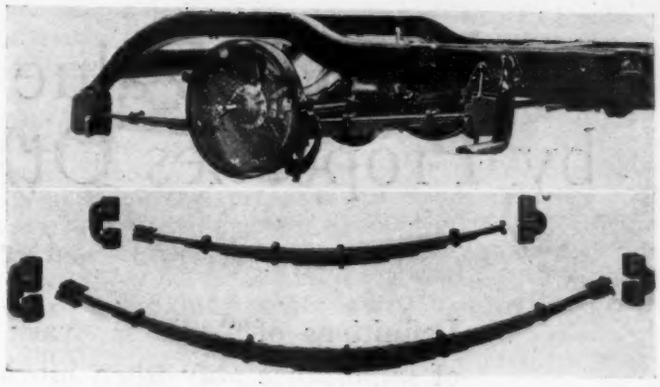
base is 125 in. Steel disk wheels are furnished at an additional charge.

Regular equipment includes speedometer and clock, non-glare lenses, Spartan horn, tool equipment, Motometer, reserve gasoline cock and gage and one extra rim.

The two open bodies are a four-passenger sporting type at $2,200 and a five-passenger phaeton at $1,985. The sporting type has, in addition to the regular equipment, a spare cord tire and tire cover, front and rear bumpers, windshield side wings, an automatic windshield cleaner, rear view mirror and built-in suitcase carrier fitted with two suitcases. Aluminum toe plates are also fitted to the running boards.

Closed models comprise a five-passenger sedan at $2,800 and a four-passenger brougham at $2,750. Both the closed models are fitted with Perfection heaters and the brougham has the built-in suitcase carrier with two suitcases and an automatic windshield cleaner.

The finish in all of the models is Sterling blue, fenders being enameled in black. The radiator shell is German silver and the lamps are full nickel.



Arrangement of rubber shock insulators used on new Sterling Knight chassis

New Micrometer Plug Gage Announced

IN production work plug gages are employed for determining the size of holes, go and no-go plugs being used to insure machining the hole to a dimension between maximum and minimum limits, a separate pair of gages is usually required for each size of hole.

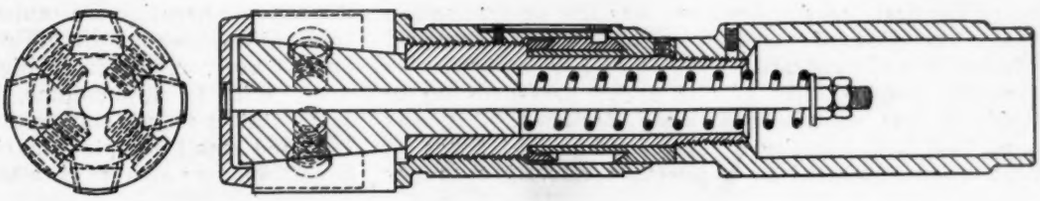
The Taft-Peirce Manufacturing Co. is now marketing a micrometer plug gage which can be fitted with stops operating in both directions so that a single gage will serve for both go and no-go limits. As will be seen by accompanying cuts the barrel of the gage is divided in exactly the same way as a micrometer barrel. Turning this barrel causes relative motion between the cone and the four blades, causing the latter to expand or contract over a range of 1/16 in.

Readings on the barrel show the size of the hole, its roundness and straightness to within 0.0001 in., it is claimed. It is possible, in grinding a hole, for example, not only to show that the hole has reached a certain size, but to inform the operator how much metal needs to be removed in the next cut to bring the hole up to required size. Changes in work limits can be made without expense for new plug gages.

It is claimed that the gage can be relapped to correct for wear and reset to size in less than a half hour, after which the gage is as good as new and does not have to be thrown aside as a solid gage would be after similar wear. The gage is, in fact, said to be the result of an effort to reduce gaging costs on a particular job in which solid gages were good for only 1500 holes each. The first gage of this type, it is asserted, was in use for five months, gaging 60,000 holes with one relapping to correct for wear. It is believed that 1,000,000 holes can be gaged with one set of blades.

Expanding members or blades are seated on the cone which is hardened, ground and lapped. The same is true of the blocks which form the ways in which the blocks slide. This gage is made in sizes varying from ⅝ to 1½ in. in steps of 1/16 in.

Sectional and outside views of the new Taft-Peirce micrometer plug gage



To Market Fuel Alcohol in Orient

MOTOR fuel, in the form of alcohol manufactured from waste molasses, is to be produced on a large commercial scale at the plant of the Pampanga Sugar Mills Company at Del Carmen, near Manila, P. I., according to R. Renton Hind, manager of the company's plantation. This decision was reached at a recent meeting of the board of directors of the company in San Francisco. The process invented by J. P. Foster, a sugar manufacturing expert of the island of Maui, one of the Hawaiian group, will be used.

During the last two years the company has been producing the new fuel oil for its own uses to the extent of 150,000 gal. a year. It now purposes to enter the markets of China and Japan and at prices much below that for which gasoline is sold in those countries, it is stated. Some of the raw sugar manufacturers of the Hawaiian Islands have been producing considerable quantities of motor fuel for the use of their own automobiles for the last two or three years and have found it to be quite satisfactory in service.

Lubrication Value of Oils Is Affected by Properties Other Than Viscosity

Part IV

Definitions of "oiliness" vary considerably. This is a factor of importance only when lubricating film is incomplete. Much speculation as to what characteristic of glycerides and fatty acids is responsible for their superior value as lubricants.

By P. M. Heldt

THE physical property of an oil that ordinarily has the greatest influence on the friction of a bearing lubricated by it is its viscosity, and for a long time it was supposed that this was the only characteristic that counted in lubrication. For the same general class of lubricants and within certain limits of loading, peripheral speed and fit, the friction of a bearing is directly proportional to the viscosity of the oil used, but when lubricants of different chemical characters are considered and the above limitations are removed this relationship no longer holds.

Probably no better illustration of this fact was ever given than that contained in the report of the Lubricants and Lubrication Inquiry Committee of the British Department of Scientific and Industrial Research made in 1920, which dealt with lubrication experiments on worm gearing. The tests were made on a Lanchester worm gear testing machine at the National Physical Laboratory, and one of the most interesting results was that at a temperature of 104 deg. Fahr. the frictional loss in the gear was exactly the same with castor oil and with neatsfoot oil, although the viscosities of these two oils at the temperature mentioned are to each other as 6 to 1. This proved conclusively that the friction reducing property of an oil does not depend upon its viscosity alone.

Observations of this character led to the introduction of the term "oiliness." No very positive definition of the term has ever been given, though several definitions have been put forward. L. P. Alford, in his book on Bearings and Their Lubrication, says that oiliness has been defined as that property of an oil that influences the change in viscosity when the oil is under pressure. It is obvious that whoever originated this definition has not yet been able to free himself of the notion that a change in lubricating value must proceed necessarily from a change in viscosity.

Tests Disprove Definition

It has since been definitely proven, however, that this is not the correct explanation. When the Lubricants and Lubrication Inquiry Committee was established in 1917, one of the first tasks undertaken was the determination of the variation of viscosity with pressure. Several different sets of apparatus, with which it was possible to determine the viscosity of oils under pressures up to 45,000 lb. per square inch, were designed. It was found that the viscosity of castor oil is 5.04 times as great when subjected to a pressure of 7.39 tons per square inch than at atmospheric pressure, and that the viscosity of a well-known grade of mineral oil is 25 times as great under a pressure of 6.47 tons per square inch as at atmospheric pressure.

Now the fact has long been known that of the two, the castor oil has the greater oiliness; that under conditions of equal viscosity it gives a lower coefficient of friction than mineral oil, and that it will maintain the film better under conditions of heavy load, but the above results show that pressure increases the viscosity of mineral oil much faster than that of castor oil. Since the vegetable oil has the greater oiliness and the effect of the pressure on the viscosity is greater with the mineral oil, it is illogical to define oiliness as the property which influences the change in viscosity due to pressure.

"Oiliness" Defined

Winslow H. Herschel, in a paper on Viscosity and Friction, read before the S. A. E. at its annual meeting in 1922, defined oiliness as "the property that causes a difference in the friction when two lubricants of the same viscosity at the temperature of the oil film are used under the same conditions." This definition undoubtedly is a perfectly safe one, but, unfortunately, it does not throw any light on the nature of the property described by the term.

It appears that oiliness is a factor of importance only when the lubricating film is incomplete. From this it follows that there are really two regimes or conditions of lubrication, in one of which, complete film lubrication, viscosity is the important factor, while in the other, incomplete film lubrication, oiliness has the greatest influence on the friction. Complete film lubrication is obtained if lubricant is supplied in abundance, if the peripheral speed is high and the specific bearing load low. Incomplete film lubrication obtains if the supply of lubricant is scant, the peripheral speed low or the pressure on the bearing exceedingly high. Improper fit of the bearing surfaces also tends to produce incomplete film lubrication. In the case of complete film lubrication the only property of the lubricant that counts is its viscosity. In automobile engines, under all normal conditions of operation we undoubtedly have complete film lubrication, because the oil is supplied in abundance, the speeds are comparatively high and, in view of the low load factor in automobiles, the bearing load is rather low. But it is not sufficient that we have low friction loss and small wear of bearing surfaces under normal conditions; we also want to be sure that our bearings are

not destroyed under the abnormal conditions that may arise in operation. For this reason, although probably more than 99 per cent of the operation of automobile engine bearings is under conditions of complete film lubrication, we cannot afford to neglect the effects of incomplete film lubrication, as this may occur under certain abnormal conditions of operation.

It is a well-known fact that vegetable oils, such as rape seed oil, have better lubricating properties than mineral oil, and it appears that in Europe a considerable amount of business is being done in compounded or blended oils containing from 20 to 25 per cent of vegetable oil or fatty oil, the rest being mineral oil. In the discussion of the report of the Committee of the Institution of Mechanical Engineers on Friction and Lubrication, made in 1884, in which the results of Beauchamp Towers' research work was presented, Daniel Adamson mentioned that fatty oils mixed with mineral oil gave the latter greater load sustaining power, and that step bearings lubricated with such compounded oils had sustained loads up to 2240 lb. per square inch.

Quality of Mineral Oils Improved

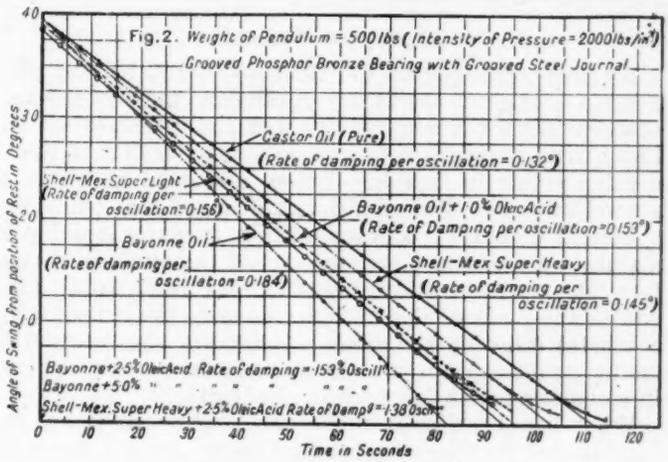
Recently it has been claimed that the improvement in the lubricating properties of mineral oil brought about by the admixture of fatty oils is really due to the fatty acids which commercial fatty oils always contain. This view has been promulgated chiefly by H. M. Wells and J. E. Southcombe, who in 1919 contributed papers to a number of British scientific and industrial associations dealing with the effect of small additions of free fatty acids to mineral oils and purporting to outline a new theory of lubrication. The fatty acids are compounds formed by the chemical combination of hydro-carbons with the mono-valent carboxyl group C O-O H, and, the same as there are many series of hydro-carbons, like the paraffin series, the ethylene series, the acetylene series, etc., so there are corresponding series of fatty acids. As an example, we have acetic acid, $C_2H_4O_2$, which is formed when the carboxyl group CO_2H displaces one hydrogen atom of the paraffin hydro-carbon methane, CH_4. Among the fatty acids the names of which are most familiar are acetic acid, lauric acid, isocetic acid, palmetic acid, stearic acid, oleic acid, rapic acid and linolic acid. The fatty oils are so-called esters of these acids; that is, they are formed by the union of the alcohol radicle C_3H_5 with a fatty acid radicle. There is also a large number of such fatty esters or glycerides, and several of them are contained in each commercial fatty oil. Thus, in speaking of a fatty oil we speak of a mixture of different fatty esters or glycerides. A general formula for the fatty glycerides is $C_3H_5R_3$, where R stands for the fatty acid radicle. The alcohol radicle C_3H_5 is trivalent, and since the fatty acid radicle is univalent, three of the latter combine with one of the former. The fatty oils comprise generally all animal and vegetable oils.

What Gives Glycerides Lubricating Value?

There has been much speculation as to just what property of the glycerides and fatty acids their superior lubricating value may be due to. It has been suggested that the surface tension or its equivalent in the case of a film of lubricant, the interfacial tension, may be this property. Surface tension is that property of a liquid by virtue of which it tends to assume a form of the least superficial area. This phenomenon is exemplified when mercury is spilled on the floor, when it forms a number of globules or spherical masses. The force results from the fact that the molecules in the surface layer are acted upon by the cohesive forces of other molecules only on one side, and are therefore attracted toward that side, whereas molecules beneath the surface are cohesively attracted toward all sides.

Wells and Southcombe measured the interfacial tension between oil and water. They used an ordinary pipette, bent into U form, which was filled with the oil to be tested and lowered into a beaker filled with water so that the top of the shorter leg of the U was some distance below the surface of the water. The tap of the pipette was then opened, whereupon drops of oil would rise to the surface of the water, the number of drops for a given volume of oil being counted. The surface tension of the oil was then inversely proportional to this number.

It was found that four grades of mineral oil gave an average value of 100 drops for the quantity of oil ex-



Graph showing rate of damping of pendulum with different lubricants

perimented with, while four vegetable and animal oils (olive, rape, cocoanut and lard) all gave much larger numbers of drops, proving that their interfacial tension with water was much lower. This lowering of the interfacial tension was found to be due to the small content of free fatty acids in the oil. The interfacial tension as thus determined could be raised by removing the acids from saponifiable oils and lowered by adding fatty acids to mineral oils.

Capillarity Claimed to Be Important

Southcombe claimed that capillarity plays an important part in lubrication, which had been ignored up to that time. All commercial animal and vegetable oils contain some free fatty acids, and hydrolysis soon forms such acids in the oils in any case, if they come in contact with moisture. Neutral glycerides, he claimed, possess interfacial tensions similar to neutral mineral oils.

It was objected that the interfacial tension between oil and water was quite different from that between oil and solid metallic surfaces, which latter cannot be measured directly. This objection has been partly met by Professor Lewis, who allowed oil to bubble up through mercury and found that the addition of 2 per cent of oleic acid lowered the interfacial tension from 100 to 89.

It may not be directly apparent why the surface tension or interfacial tension should have any influence on the lubricating value of an oil. The explanation is that if the oil has a low surface tension it will spread more readily over the metal surface, and its power to maintain a film will be increased. A fluid is capable of acting as a lubricant on a given surface only if it will wet that surface; that is, if the force of adhesion between its particles and the particles of the metal surface is greater than the force of cohesion between its own molecules.

Great adhesion or affinity between the molecules of the metal and the molecules of the fluid is necessary in order to make the latter a good lubricant. In this connection the observation is of interest that the lubricating value of a mineral oil depends chiefly on its content of unsaturated hydro-carbons. These are hydro-carbon compounds that are capable of taking up further hydrogen. Such compounds necessarily have residual affinity, and it is believed by some that owing to this affinity they enter into some sort of combination with the molecules of the metal surface, which enables them to oppose greater resistance to the breaking of the lubricant film. It has recently come to be recognized that residual affinity plays a very important part in the behavior of organic compounds, affecting their color, odor, taste and physiological activities.

Theory of Colloids

Another approach to the problem of lubrication phenomena is through the theory of colloids. Colloids are substances of a gelatinous nature and are intermediate between true chemical solutions and suspensions of finely divided solids in liquids. Starch dissolved in water is a good example. Wilhelm Ostwald found that whenever a colloid comes in contact with a surface it fails to maintain a uniform distribution. At the surface of contact the concentration becomes different from that within the mass of the colloid. Usually the colloid concentrates more on the surface, and this phenomenon is known as absorption, a term which is frequently applied in connection with lubrication phenomena.

What has been said above sheds some light on the question as to why the bearing metal should have an influence on the magnitude of the friction, which question naturally suggests itself when it is asserted that in normal lubrication the metal surfaces are completely separated by a film of oil. That the character of the bearing metal has an influence on the friction and also on the specific load the bearing will carry has been indicated by practically every series of tests made. Archbutt, for instance, found that under the same conditions of speed and with the same oil a white metal bearing would carry twice the load as a bronze bearing without increase in friction.

Test Methods Outlined

Southcombe in his experiments used a Thurston machine, the bearing being 3.8 in. in diameter by 6.5 in. long. In the tests the load was carried at 200 lb. per square inch, the peripheral speed at 11 ft. per minute and the oil temperature at 62-64 deg. Fahr. The quantity of oil used was 5 cu. cm. Four grades of oil were tested. A was a pure mineral oil; B a compounded oil consisting of 97 per cent of the A oil, 1 per cent of a pale cylinder oil, and 2 per cent of commercial fatty acid; C consisted of 80 per cent of the A oil and 20 per cent olive oil, and D consisted of 40 per cent of the A oil and 60 per cent of olive oil. The results of the tests are given in the table below:

Oil	Viscosity at 60 Deg. Fahr.	Spec. Grav. at 60 Deg. Fahr.	Total Acidity	Coefficient of Friction
A.....	953	0.909	nil	0.0084
B.....	973	0.909	1.9	0.0052
C.....	980	0.908	0.3	0.0084
D.....	970	0.907	0.91	0.0073

One of the objections that is generally raised against the presence of acids of any kind in oil is that they tend to corrode the journals. Southcombe states that all compounded oils containing vegetable or animal oils contain free fatty acids, and though such oils are largely used one never hears of bearing corrosion. He proposed to add only a small proportion of the fatty acids, whereas by the hydrolysis of the fatty glycerides in fatty oils large percentages of the acids might be formed. The lower members of the fatty acid series, such as formic and acetic acid, form compounds devoid of detergent action, while the higher members, from lauric acid up, form soapy colloidal compounds and are themselves of a colloidal character. All commercial fatty oils are mixtures. Cocoanut oil contains chiefly the lower members of the series, while rape oil contains the higher members. Only the latter fatty acids, the colloidal ones, emulsify when shaken with oil, while the lower members have a de-emulsifying effect.

The firm represented by Wells and Southcombe produces an "essence" or tonic which is recommended for addition to mineral lubricating oils in proportions of from 2½ to 5 per cent. It is claimed that in cases where bearings have shown a tendency to run hot the addition of this essence, known as Tonicol, to the lubricating oil has stopped the heating. The chief argument put forth in favor of this compound is that it serves the same purpose as the addition of large proportions of vegetable oils, which latter are needed for other purposes than lubrication, while the commercial fatty acids are cheap and are required only in small quantities. An analysis of Tonicol was made by the Lubricants and Lubrication Committee and it was found to consist of a mixture of free fatty acids with mineral oil.

Experiments Bear Out Claims

Results obtained by various other experimenters have tended to bear out the claim made for the free fatty acids. Archbutt, using a Thurston friction testing machine, obtained the following coefficients of friction with mineral oil and mixtures of mineral and rape oil, the figures in the top line being the proportion of mineral oil in the mixture and those in the bottom line the corresponding friction coefficient:

100	90	80	60	40	20	0	100
0.0066	0.0065	0.0062	0.0053	0.0047	0.0041	0.0043	0.0062

Additions of 0.5, 1 and 2 per cent of free fatty acids reduced the friction coefficient of the same oil to 0.0049, 0.0045 and 0.0042.

The effect of small additions of fatty acids to mineral lubricating oil was also investigated by Dr. Stanton in the course of the research work forming the basis of the recent Lubrication Research Committee report. The testing machine used was of the pendulum type, the motion was oscillating, the specific loads were high and the peripheral velocities low. In one series of tests a mineral oil known as Bayonne was used. The pendulum was set in motion with a given amplitude of swing and the decrease of the amplitude with time was noted and plotted. In this way graphs were obtained which were practically straight lines except for the very end, when the oscillations were practically damped out. The inclination of these lines was a measure of the total friction and, as the load remained constant, also of the friction coefficient.

Comparative Researches Made

After the test with the Bayonne mineral oil as lubricant had been run, another series of tests was run off in which a lubricant was used composed of Bayonne oil with an addition of 1 per cent of oleic acid. The graphs for the Bayonne oil and the compounded oil tests are shown herewith. It was found that the addition of the small proportion of oleic acid reduced the friction coefficient by 17 per cent. Additions of larger proportions of the acid were tried out, up to 5 per cent, but no improvement in the lubricating qualities of the oil were observed.

Roomier Bodies and Lower Frame Are Features of New Dort

Radiator and hood lines have been modified. Curved lines replace former sharp corners. No change in engine. Five body models offered. Straight frame side members altered slightly.

LARGER, roomier bodies have been mounted on lowered frames of the new Dort six-cylinder car. Radiator and hood lines have been modified to replace the former sharp corners and flat surfaces by curved lines at the top, sides and intersections. Production is to be concentrated on the six-cylinder line, the four-cylinder model having been discontinued.

Mechanically, the new car is similar to the former six-cylinder model.

Thermoid-Hardy universal joints at each end of the tubular propeller shaft have replaced the single metallic universal joint that ran within the yoke at the front end of the torque tube. Although the cantilever spring construction at the rear and the same wheelbase, 115 in., is maintained, the former straight frame side members have now been swept up 3 in. over the rear axle.

Generous passenger capacity has been the keynote of the design of all the new bodies. Leg room has been increased in both the front and rear compartments and the width of the seats provides ample room for the rated number of passengers of more than average size. With the exception of the regular five-passenger phaeton, each model is provided with an unusual amount of auxiliary and accessory equipment.

The complete line now consists of the following models:

Standard five-passenger phaeton, at $1,095.

Sport phaeton, at $1,245.

Five-passenger three-door coupe at $1,535.

Five-passenger three-door brougham, at $1,535.

Five-passenger sedan, at $1,595.

Nickel plated radiators, cowl ventilators and 31 x 4 in. cord tires are standard on all models. The phaeton is finished in black with green leather upholstery and has wood wheels. Incidental equipment includes foot and robe rails, rubber mat on the front floor boards, 18 in. diameter steering wheel and provision of a gasoline gage on the tank.

In addition to the regular equipment, the sport phaeton is fitted with a front bumper, moto-meter and bar cap, parking and stop lamps and Clymer spot lamp in the one-piece windshield which carries an automatic cleaner and rear view mirror. The tire carrier on the left front fender is equipped at the factory with a spare tire and cover. This model is finished in blue with Spanish leather upholstery and has a trunk rack at the rear.

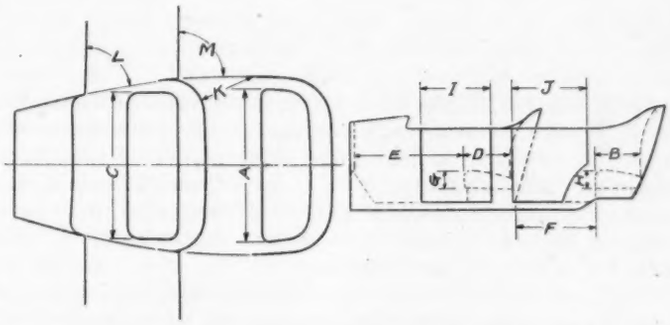
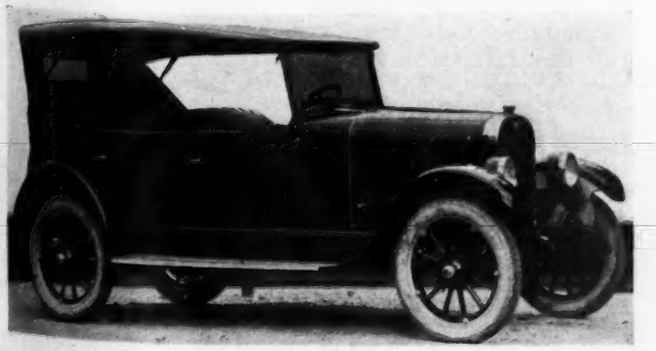


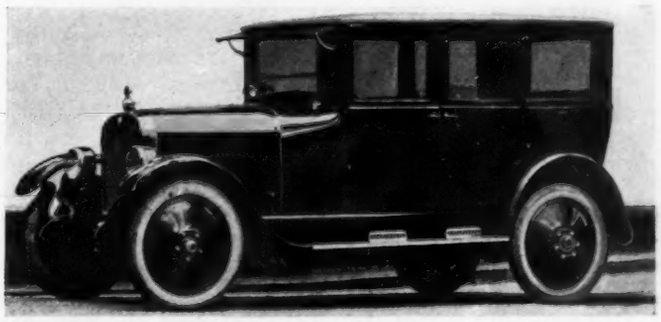
DIAGRAM SHOWING GENERAL DIMENSIONS OF TRIMMED BODIES

SYMBOL		TOURING CAR	SEDAN
A	WIDTH OF REAR SEAT INSIDE TRIMMING	48 3/4	49
B	DEPTH OF REAR SEAT	18 1/2	20 1/2
C	WIDTH OF FRONT SEAT INSIDE TRIMMING	45 1/2	47 1/2
D	DEPTH OF FRONT SEAT	18 1/2	17 1/2
E	FRONT SEAT LEG ROOM	26	27
F	REAR SEAT LEG ROOM	25 3/4	25 1/2
G	THICKNESS OF FRONT CUSHION	8 1/4	8 1/4
H	THICKNESS OF REAR CUSHION	9	9
I	WIDTH OF FRONT DOOR	23	25 1/2
J	WIDTH OF REAR DOOR	23	25 1/2
K	CLEAR OPENING OF REAR DOOR	17 1/4	18
L	ANGLE OF CLEAR OPENING OF FRONT DOOR	90°	90°
M	ANGLE OF CLEAR OPENING OF REAR DOOR	90°	90°

In external appearance the five-passenger coupe is the same as the five-passenger brougham. Each of these models has two front doors and one rear door at the right side. In the coupe, a full width rear seat is supplemented by a fixed bucket seat and hinged disappearing seat at the front. The brougham has two full width seats. The rear seats in both these models can be removed to provide baggage or luggage space.



Five-passenger phaeton



Five-passenger sedan

Two-Thirds of Truck Hauls Are Less Than 30 Miles

This condition found to exist in Connecticut, according to survey conducted by U. S. Bureau of Public Roads. Dr. J. G. McKay outlines field of motor transport at Richmond highway meeting. Taxation and financing roads are among other topics discussed.

"TWO-THIRDS of the total net tons of commodities transported over the Connecticut highways were moved less than 30 miles. This movement can be called the short haul zone. The balance of the tonnage transported by motor trucks, 32.6 per cent, moved 30 miles or more and is partially competitive with rail or water transportation.

"The analysis of motor truck transportation during the spring months of 1923 indicate that the proportion of the tonnage transported by motor trucks beyond 30 miles is reducing in the New England territory, indicating that the economic sphere of the motor truck is primarily in the short haul zone."

These were some of the significant facts brought out by Dr. J. G. McKay, U. S. Bureau of Roads, in an address made in Richmond last week at the Highway Session of the convention of the American Society of Civil Engineers. McKay discussed the findings of recent traffic surveys which have been made under his direction and outlined four major fields of motor truck transportation.

Other speakers who discussed factors of special interest to the automotive industry were Thomas H. McDonald, chief of the U. S. Bureau of Roads; Pyke Johnson, secretary Highways Committee, N. A. C. C., and A. T. Goldbeck, U. S. Bureau of Roads.

Carrying out the thought expressed in the paragraphs quoted above, McKay said in part:

The importance of motor truck transportation as an integral part of our national transportation system is growing in significance and I am venturing here to set forth in the order of their importance a brief preliminary statement of the four main fields of motor truck transportation:

1. Organized urban motor truck transportation in congested terminal areas consisting of motor truck terminal to terminal freight transfers as well as pick up to delivery service. This can be illustrated by the operation of the U. S. Trucking Company in New York City in cooperation with the Erie Railroad in the transfer of freight from the Erie-New Jersey terminal to New York City for delivery. Carefully organized and efficiently operated motor trucking companies, assured of rail and steamship cooperation, will materially speed up terminal freight movement, decrease the volume of freight warehoused, reduce the cost of moving freight through terminals and expedite the rail delivery time of l.c.l. freight.

2. The organization of motor truck freight service to supplement and extend existing rail and water transportation agencies. The development of motor transportation companies in areas inadequately served with rail or water transportation offers an enormous possibility for the economic extension of highway transportation. This type of service is especially desirable in the development of new areas or localities with insufficient transportation facilities and will make available additional tonnage for movement by rail or water. This is a non-competitive service extending and supplementing existing rail and water agencies.

3. The short haul transportation of freight probably not to exceed 30 miles. The freight transported by motor trucks in the short haul zone is largely a non-competitive assembly and distribution of commodities. The differences in the density of population in different areas, the distances between cities and areas of production and distribution, the prevailing type of production and the type of rail or water transportation available may decrease or increase the above zone of the short haul.

4. Motor truck transportation of a limited number of special commodities in the long haul zone in which delivery time, the character of the goods transported or the demands of the industry or trade indicate the desirability of motor truck transportation. This type of freight is but a small percentage of the total net tonnage transported over the highways.

Competition Is Sharp

One of the outstanding developments of the present era of motor truck transportation in New England is the sharp competition existing between interurban motor truck operators. They do not operate on the basis of published tariffs since rates fluctuate rapidly, largely due to the under-bidding of small motor truck organizations and irregular operators. There is a lack of uniformity in rate-making. Rail rates, mileage, tonnage available, what the traffic will bear, contract, bid business and the probability of return loads are the determining factors in rate making.

Combined motor truck and boat, and motor truck and rail l.c.l. transportation is developing in the New England territory. The Starin New Haven boat line transports freight from Connecticut inland cities to New Haven by motor truck and by boat from New Haven to New York City. The correlation of motor and rail transportation is developing in New England similar to the joint motor truck and water transportation of freight. The service performed by Stone's motor truck express is typical of this development. Freight is transported by motor truck to selected rail shipping points and the long haul l.c.l. freight handled in carload lots.

The same correlated truck and rail service is being developed in territory tributary to Philadelphia, Baltimore

Washington, Camden, N. J., and the eastern shore of Maryland. This modern development in the correlation of highway transportation with rail and water agencies in the movement of freight is an economic function of motor transportation and offers an extensive field of development supplementing rail and water service. It is not competitive, provides a pick up and delivery service, allocates the short haul to motor truck transportation and the long haul to rail and water, and provides rapid transportation of freight.

In general manufacturers in the New England territory ship by motor truck for two principal reasons: (1) Rapid service. (2) Trade demands. The improvement in rail service in New England since Jan. 1, 1923, has resulted in a decrease in the motor truck freight hauled beyond the 30-mile zone and indicates that when a given community is offered effective transportation by rail or water that the motor truck finds its most effective field in the terminal area, supplementary to existing transportation agencies, or in the short haul transportation of freight.

Pyke Johnson made a number of pertinent comments on taxation, particularly as related to common carriers. He said in part:

If it is desirable that other common carrier transportation agencies should be charged a special franchise tax for the right to do business, then the question arises as to whether or not similar taxes should be lodged against the motor common carrier in addition to the special levies already mentioned.

If such taxes are deemed advisable definite franchise privileges will, of course, be asked in return, which should, while first of all protecting the public, still insure the agency of a fair return in exchange for service. This would mean then that the common carrier truck operator would bear an added charge comparable in degree but not in extent to that lodged against other common carriers.

To what extent this is now being done and the effect which this practice has are questions which go somewhat beyond the field of the Connecticut report, but none the less they are questions which must sooner or later be brought under review.

What would happen to America if, tomorrow, someone should roll up all of our highways and walk away with them?

Highways Do Not Create Tax Burden

The other question is, "What effect is this highway program actually having upon the burden of the general taxpayer?" The man who will stop and analyze this, will find that highway taxation is not the factor in current taxes which it is generally presumed to be because out of a total expenditure of $1,000,000,000 for highways in 1921 authoritative figures show that but 44 per cent came from current State and local taxation, the remainder being derived either from special charges against highway users, from bond issues which will eventually be paid in large part by motor users or from Federal funds which in turn are less in extent than the special taxes paid by motor manufacturers and by them passed on to the consumer.

Service and facts—these are the essentials to transportation success and only as we obtain both will the full needs of the public be met.

Lockheed Hydraulic Brakes Optional Equipment on Chalmers

THE Lockheed four-wheel hydraulic brake system has been adopted as optional equipment on Chalmers cars at a $75 extra charge. The system comprises an external contracting brake on each wheel operated by the brake pedal through a master cylinder. The emergency hand brake is separate and distinct, being operated by a lever in the usual manner and acting on a drum mounted on the front end of the propeller shaft.

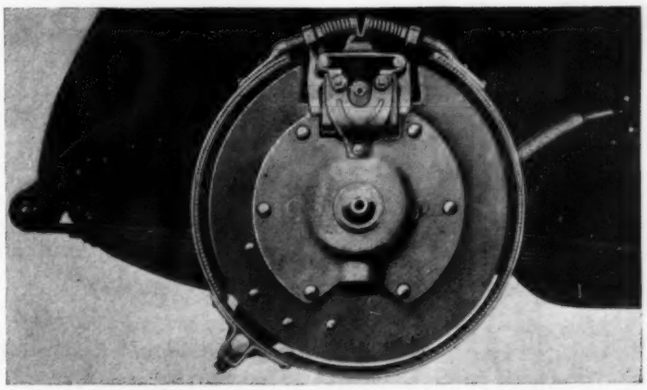
Pressure on the brake pedal is transferred to a piston working in a master cylinder, which is bolted to a bracket on the left side of the clutch housing. Leading from this master clyinder to cylinders in each of the four brake drums are copper tubes and armored hose connections. Working in the drum cylinders are two pistons, each of which is connected in turn to a lever which actuates the ends of each brake band. The pistons in the brake drum cylinders are returned against the stop by brake retractor springs, giving clearance between the lining and the brake drum.

As will be seen from the accompanying cut of the front-wheel brake, the brake anchorage is so placed that about one-half of the circumference of the lining gives wrapping action in forward motion of the car, while about half this amount of wrap is obtained in rearward motion. The lining covers about three-fourths of the drum circumference and is cut away at the anchorage and at that portion of the arc which is adjacent to the hydraulic cylinder. Compression retractor springs are employed. Rear-wheel brakes are similar in design and arrangement.

The whole system, that is, the cylinders and lines, is full of liquid, all of the air having been expelled in the process of filling.

A small hand pump and tank containing an additional supply of liquid, which can be pumped directly into the master cylinder when it becomes necessary to replenish the supply of liquid, is mounted on the right side of the engine, where it is accessible when the hood is lifted. This pumping device and the arrangement of the brake pedal in such a way that the piston in the master cylinder simply contacts with the pedal, which is free to travel back without pulling the piston in the master cylinder, are the only two material differences in this installation as compared to the system lately described by Lockheed in his papers before technical societies.

The liquid used consists of a 50 per cent glycerine and 50 per cent denatured alcohol mixture. The total capacity of the system is 1½ pt.



Front wheel brake of the Lockheed hydraulic brake system as installed on Chalmers cars

The FORUM

Free Steering Is Essential in Brake Design

Front-wheel type brings new problems. Center point layout is advocated. Same actuating mechanism front and rear desirable.

Editor, AUTOMOTIVE INDUSTRIES:

My views covering four-wheel brakes are expressed in part, in the following comments:

First, I am certain that the part of the public which understands is willing to pay for, and wants four-wheel brakes.

Second, I am confident that most designers do not realize that stiff linkages and incorrectly designed cams and other related units must not be allowed to react against steering. Steering must be made as easy as possible by use of some form of centered point layout, and a camber angle not exceeding one degree, after the axle has been deflected under the load of the car. I think this is sufficient for the normally flat roads of today; however, the wheels should never be allowed to camber in the wrong direction. Joints of a design such as to require little lubrication are desirable, as the public does not use the grease gun as frequently as it is needed.

Third, since the front wheels tend to skid when taking sharp turns on a wet street, especially if locked, they should be equipped with a safety device which on such turns will release the front brakes sufficiently to allow the rear brakes to be suddenly applied. This will transfer the skid to the rear wheels and swing the rear of the car into the steerway position so that the car can safely proceed along the road into which the turn is made.

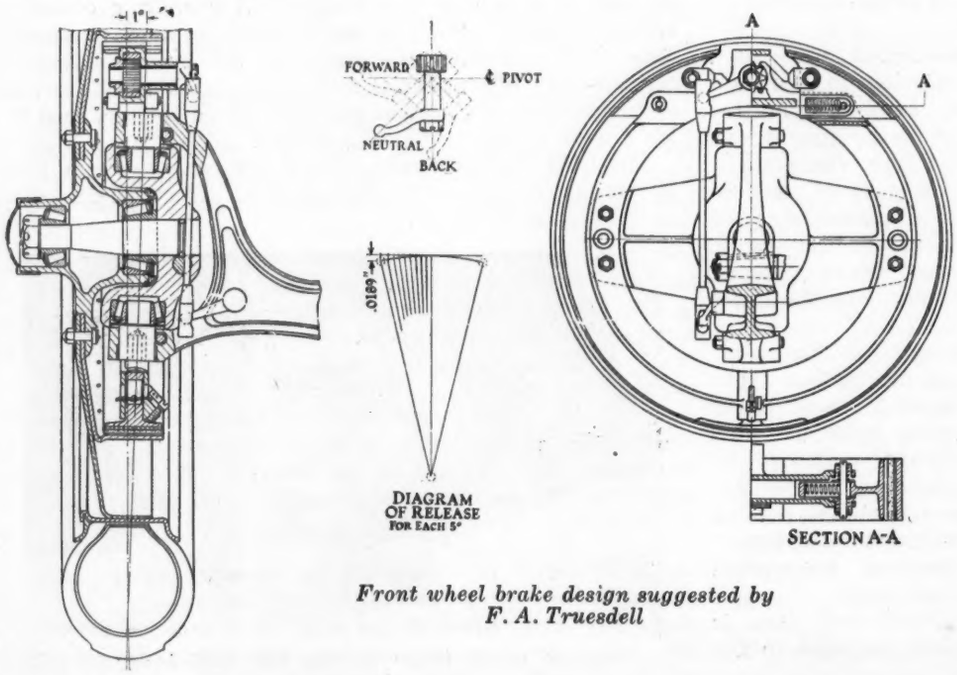
Fourth, I firmly believe that brakes should have the same actuating mechanism front and rear so that, for a given pressure on the pedal, one can always judge how hard the brakes will be set. To facilitate this the mechanism should be designed to give a uniform increase in pressure as the pedal is depressed, not a variable pressure such as a toggle always gives.

Fifth, I consider the most efficient brake one of the flexible internal expanding type with no external brake on the drum. For the hand brake it may be preferable to use a geared up brake on the rear axle pinion shaft just back of the rear universal joint. This brake drum can be arranged to surround the pinion bearing housing with its operating mechanism attached to the axle. A good design will insure a quiet brake at this point. This, of course, would have to be a contracting brake.

Sixth, the regular service brakes should be designed to wear out 3/16 in. of lining without adjustment at any point except at the anchor pin.

Seventh, I do not believe that front wheels should have less braking effect than the rear except when the wheels are cramped, the reason being that, when the brakes are applied, the center of gravity, in effect, moves toward the front end, if traveling forward.

One of the reasons advanced in favor of less braking effect on the front wheels is that most cars have the greater part of their weight on the rear wheels. This is true, but we must not forget the effective shift in weight when the brakes are applied. A second reason is that in most front-wheel braking systems, either cams or universal joints, or both, are used. Most cams have a tendency to lock the wheels on turning a curve with the brake applied while the universal joints have a tendency to release the brake on the outside and lock the inner one. This condition varies with the positions of the joints and will change with the



Front wheel brake design suggested by F. A. Truesdell

wear of the brake linings. It is a well-known fact that universal joints are not recommended for use at angles of more than 12 to 15 deg. whereas on the front wheels they must act at angles of 30 to 40 deg. It is therefore obvious that such conditions will react on the steering gear and may render the car unmanageable.

Also if the inner wheel, which, of course, has the lesser load in rounding a curve, locks it is bound to lose its traction and once one wheel skids, both wheels invariably will do so. The proper construction is one which releases each brake according to the load on the respective wheel.

This is what happens automatically, within moderate speeds, in the design shown in the accompanying cut.

If many four-wheel brakes that have the faults cited are put on the market, they will surely tend to prejudice the public against all four-wheel brakes.

There are many things to consider in four-wheel brake designs but most of the obstacles can be surmounted by good careful detail design. As your editorials have said, many of the present brakes do not show that sufficient consideration has been given to that part of the car.

F. A. TRUESDELL.

Street Marking Aids Safety

Editor, AUTOMOTIVE INDUSTRIES:

The constructive ideas for the improvement of traffic conditions in our large cities as advanced by Mr. Alvan Macauley and Mr. Colin Campbell in recent issues of your magazine are of such importance as to deserve the cooperation of everyone who can suggest anything which will help to make them effective.

Perhaps the most baffling difficulty in applying ideas of this nature is the mass of preparation necessary to get the cooperation of the public. The great majority of drivers are amenable to reasonable regulations, and even those who are taken into court as traffic violators are in very few cases willful offenders. The great difficulty is that there are too many rules to learn. Driving regulations have multiplied in all our cities, and they vary between cities and States and between different sections of the same city to such an extent as to be exceedingly confusing. A further complication is added by the endless variety of methods of marking streets. What with signs on pavements, targets on poles, standards set in the sidewalk, lamps of various colors, fire department routes, five-minute parking spaces, twenty-minute parking, one hour parking, etc., the ordinary driver is more than likely to break one law in his intentness on observing another.

A share at least of this confusion could be done away with by a well organized scheme of curb marking. Several years ago the writer advanced a suggestion to the Detroit Police Department which has been put into practice in a very limited way in the downtown district. The idea is to mark all spaces in which parking is prohibited by painting the curbing a bright red. In Detroit, the distance from a fire hydrant is 15 ft. each way. If the curb is painted for 15 ft. no driver has to guess as to how far 15 ft. is. This works out well. Now suppose it were extended to include all spaces where parking is prohibited either day or night. Spaces in which night parking is allowed but day parking prohibited could be painted with alternate stripes of red and black. One-way streets could be marked by painting the curb on the right-hand side only with a suitable color. Streets reserved for light traffic could be indicated by the selected color. Truck streets could be similarly defined.

By working out a suitable code it would seem possible to do away with a great mass of obstructions from our streets, and to provide a constant reminder to every driver of those regulations which apply to the exact area through which he is traveling. Instead of having to look at the pavement, on the wayside poles and standards, and overhead lamps, the driver would have practically nothing to watch except the curb. Even where lines of cars are parked, he would, presumably, get sight of the curb often enough to guide him.

Of course, the most important benefit to be derived from such a system would lie in securing its uniform adoption. It would be necessary to obtain suitable legislation both to prevent its unauthorized use and to insure its uniform application. By the cooperation of traffic experts it should be possible to work out a simple code which would function smoothly anywhere on this continent; even in the rural districts where no stone curb exists, the same results could be obtained by erecting and painting board markers. If it accomplished nothing else, it would be worth all it would cost in the benefit it would give to tourists. It would presumably be a great help to the authorities in removing the excuse of ignorance of local rules.

This idea, while not startling in itself, might be just the thing needed to give effectiveness to larger plans; and with this idea in mind, it would be most interesting to learn the opinion of your readers and to secure additional suggestions along this line.

W. W. BLAKELY,
Blakely Manufacturing Co.

Commercial Vehicle Competition in Transcaucasia

TO determine the types of motor vehicle best suited for the transportation of passengers and merchandise on the roads of Transcaucasia, and to serve as a basis for the granting of import permits, a competitive test over a distance of 625 miles was organized by the plenipotentiary of the People's Commissariat for Road Transportation of the Federation of Soviet Republics in Transcaucasia. It started on Oct. 1.

The object of the contest was to determine the capacity, durability and general suitability of the vehicles entered for use on the roads of Transcaucasia. Vehicles entered for the competition were admitted free of duty. Two classes of vehicles were desired, viz., trucks up to 4 tons carrying capacity and motor buses with a piston displacement not to exceed 305 cu. in. Following are some of the features of construction which the organizers of the contest consider important in vehicles for service in that district: Minimum road clearances, motor trucks, front axle center, 8 in.; rear axle center, 8 in.; flywheel, 12 in.; bell housing, 10 in. For passenger vehicles, front axle center, 7 in.; rear axle center, 6 in.; bell housing, 10 in. The steering tie rod should be located back of the front axle and not lower than the latter. Truck engines must be fitted with a governor which limits the speed to 12.5 m.p.h. in the case of trucks of 3 tons and over and to 15.5 m.p.h. in the case of smaller trucks. A list of the items of equipment desired is given and one of the conditions is that a list of repair parts prices should be furnished, "preferably in Russian." Since Transcaucasia has its own motor fuel supplies, a considerable development of motor transport in that country may be looked for.

A NEW aerial passenger service recently was inaugurated between Southampton and Guernsey, an island in the British Channel off the coast of France. One trip each way is to be made each day, the time of the single trip being about an hour and a quarter.

Automatic Tilting Work Table Chief Feature of New Surface Grinder

Williams, White & Co. product capable of handling wide range of production will grind plane surfaces such as oil pans and cylinder heads with maximum dimensions of 10 in. x 40 in.

SEVERAL unique features of construction and operation are incorporated in the Osterholm automatic surface grinder, which is the product of Williams, White & Co. Practically every operation except the actual loading and unloading is automatic. This operation is facilitated by an automatic action which tilts the work table away from the wheel, making it very accessible. After the work fixture has been reloaded, engagement of a single lever returns the table to the working position, turns on the coolant, which is supplied through the center of the wheel spindle, sets the table oscillating across the faces of the cup-wheel and engages a cam which automatically advances the wheel toward the work and then feeds uniformly to the finished position.

This grinder is capable of handling a wide range of work and requires only a limited floor space. Equipped with a tilting table, plane surfaces such as those of cylinder heads, oil pans, etc., with maximum dimensions of 10 in. x 40 in. can be ground. Group fixtures within the same dimensional limits permit grinding of a number of small pieces at a single loading. In this class may be included the faces of ball bearing races, washer faces and bearing surfaces of cover plates, brackets, etc. With the addition of motor driven heads, which are bolted to the tilting table, a wide range of peripheral and surfacing operations can be performed on a quantity production basis.

Crown pulleys may be ground and edged by the use of special rotary fixtures. The mounting surfaces of bevel ring gears can be ground by the use of the same type of fixture, and bell housings can be handled with an adaptation of it. A multiple spindle head has been developed for finishing the cam surface of valve lifter tappets. Double rotary heads carry ball bearing rings and other pieces of the same nature for cylindrical grinding operations.

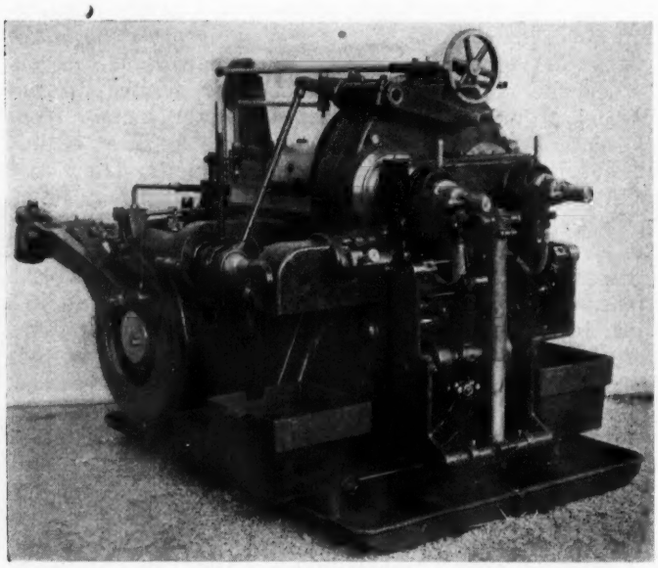


Fig. 1—Osterholm automatic surface grinder with fixture for simultaneously grinding the faces of two ring gears

The cup-shaped wheel of 20 in. outside diameter is retained in the end of the spindle by a steel draw-in clutch. The spindle, which is made hollow for the accommodation of the coolant supply pipe, is carried in two babbitt bearings and driven by a 10-in. belt at 900-1000 r.p.m., depending on the class of work, a maximum of 30 hp. being required. The reaction or thrust of the wheel is taken at an adjacent thrust bearing, and the means for adjusting the endwise play is located at the rear spindle bearing. The dimensions of the spindle bearings are 4½ by 11 in. for the wheel bearing and 3½ by 9 in. for the tail bearing. Both bearings are lubricated by chain oilers.

Spindle Head Mounted on Slide

The entire spindle head is mounted on a slide and located by a screw and hand wheel adjustment. This adjustment constitutes the hand feed, but is used in production work merely to locate the wheel and adjust for wheel wear. The outboard end of the adjusting screw is threaded into a pedestal which is operated by a rack which in turn is actuated by the feed cam to form the power feed. The sector which advances the rack is located on a cross shaft at the back of the machine. This cross shaft carries a large cam lever with an intermediate cushion spring.

A roller at the long end of this lever engages with the feed cam which draws the wheel back 3/16 in. during loading, then brings it up into working position and finally establishes a constant rate of feed through any predetermined distance to the finished position. When the finished position is reached, the roller follower rides up the advance side of the cam peak, causing the feed lever to contact with a trip lever which shifts the feed belt to a loose pulley, at the same time stopping the table oscillation. This belt drives a pulley which is located on one end of the worm shaft which drives the work table oscillating mechanism. At the opposite or forward end of this worm shaft is located a set of change gears which transmits a drive to the worm shaft of the worm and gear combination that drives the feed cam shaft. An emergency jaw clutch is installed on the feed worm shaft, being operated by hand lever. When this lever is disengaged, the work table continues to oscillate but the wheel head ceases to advance. Varying rates of feed may be obtained by interchanging cams, although the manufacturer has devised an adjustable spiral cam for the same purpose.

Whereas the contour of the feed cam controls the rate of feed for a given operation, the time for a cycle of operations is determined by the ratio of the change gear set. The combinations which have been adopted permit a range of actual working time that varies from 10 sec. for small work to 2 min. for heavier operations. Because of the rela-

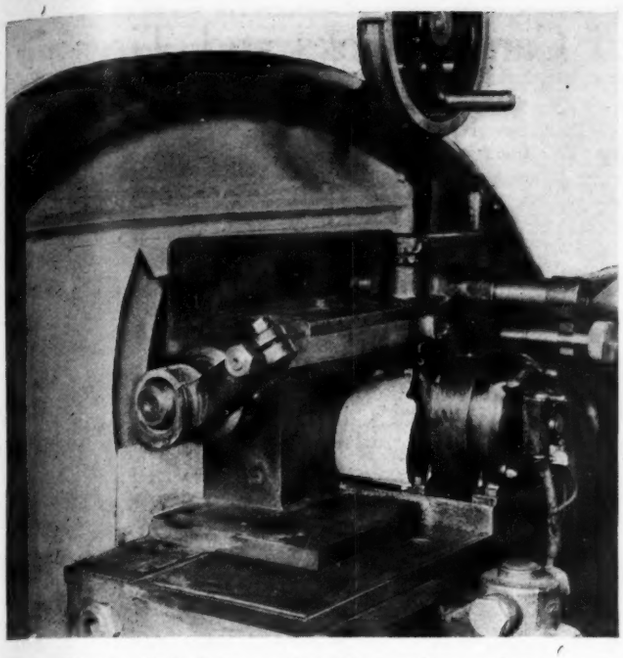


Fig. 2—Osterholm automatic surface grinder adapted for cylindrical grinding

tive lengths or ratio of the feed cam roller lever arm, profiling of the feed cam is a comparatively simple operation and need not be held to micrometric limits. As the reduction is great, a reasonable degree of accuracy at the profile of the feed cam produces very close results at the feed rack.

The work table is carried on a rugged cast iron trunnion having two very large bearings that are mounted in the column somewhat below the center of the spindle in the same vertical plane. Adjustment for endwise clearance of the trunnion barrel is made at an adjustable collar which backs up the rear bearing. Oscillation of the work table is set up by a vertical rack which engages with a gear segment that is mounted on the trunnion barrel between the two bearings. The rack is carried in a vertical slide and actuated by a Scotch yoke assembly that engages in a horizontal slide at its back. The trunnion pin of the yoke assembly is mounted on the inside end of the inner worm shaft assembly and is adjustable radially to vary the length of stroke at the work table.

Worm Gear Drive Shaft

The oscillation drive shaft is driven by a worm gear whose worm shaft carries tight and loose drive pulleys as previously mentioned. Both the feed and work table oscillation are engaged at this pulley assembly by a push rod, and both actions are disengaged by the trip lever which contacts with the feed cam lever arm.

Tilting of the work table for loading is accomplished by a heavy lever which is keyed to the feed lever cross shaft and actuates a rod passing through the trunnion barrel. After passing through the trunnion barrel to the front, this rod engages with a toggle lever and cam action which tilts the table. A secondary system of toggle levers and hardened stop buttons locks the work table in a true horizontal position and relieves the cam with the intermediate linkage of all cutting reaction load. The work table is also counterbalanced by an inclosed spring. Tilting of the work table is accomplished by the peak of the feed cam that backs the grinding wheel off during loading.

An unusual feature consists in the method of coolant control and circulation. In the first place, the coolant is introduced through the center of the spindle by means of a long tube which projects into a stationary packing gland located outside of the rear end of the spindle. A deflector at the opposite or forward end of the supply tube diverts the coolant stream into the inside of the cup wheel, from which point it cataracts across the entire cutting surface as a result of centrifugal force. Because of this feature, cast iron pieces which have been subjected to an unusually heavy rate of cut have been observed to come off the machine with no apparent increase of temperature.

To facilitate loading the supply of coolant through the spindle is cut off by a selective valve which is operated by an extension of the heavy lever that operates the tilting mechanism at the back of the machine. During loading the pump outlet line delivers into the slush pans.

Rotary Head Fixture Illustrated

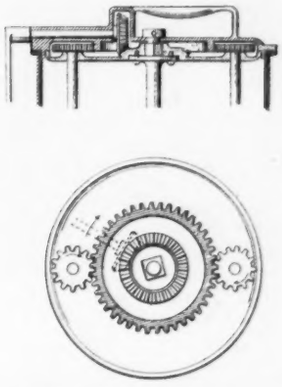
Fig. 1 shows the grinder equipped with a double rotary head fixture for the grinding of two ring gear faces simultaneously. In this instance, the drive for the two heads is taken off of the feed worm shaft and includes a secondary change gear set as shown. The tilting feature is fully effective in this layout and secondary coolant lines are led into the fixture spindles. In this arrangement, the work table does not oscillate but the ring blanks are rotated, one at each side of the center of the abrasive wheel. Wheel dressing is accomplished by the arm which is seen just below the hand wheel and is actuated by the eccentric and strap from the drive shaft.

An arrangement for peripheral cylindrical grinding is illustrated in Fig. 2. Two heads are driven by an auxiliary electric motor which forms part of the fixture layout that is attached directly to the standard work table and tilts outward in the regular manner for loading. The work table oscillates through a short distance in this set-up, swinging each blank across the full width of the cup-wheel rim. With the use of a wheel of the correct grade and grain, close limits and an excellent finish are produced.

New Mixer for Paints

A NEW principle is claimed to be embodied in a mixer recently placed on the market by the Columbia Metal Products Co. The mechanism comprises a pair of revolving beater blades and a central revolving spiral scraper. The latter raises the materials to be mixed from the bottom of the container, permitting the beater blades to work on them effectively. It is claimed that the 10-gal. mixer will break up and thoroughly mix 100 lb. of lead, oxides or fillers and 7½ gal. of oil in 10 minutes. In most of these mixing operations, the solids, being the heavier components of the mixture, tend to settle to the bottom. The spiral element of this mixer raises the materials or pigments from the bottom and throws them in the path of the beater blades.

Cut-away view of Columbia mixer



Operating mechanism of Columbia mixer

Exports of Cars, Trucks and Tires for

COUNTRIES	GASOLINE PASSENGER CARS								GASOLINE TRUCKS					
	Up to $500		$500 to $800		$800 to $2,000		Over $2,000		Up to 1 ton incl.		1 to 2½ tons		Over 2½ tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Europe														
Austria	4	$1,924												
Azores and Madeira Islands	2	749	1	$577	1	$1,336								
Belgium	276	95,993	5	3,777	4	4,606	4	$14,335	333	$83,634				
Czechoslovakia														
Denmark	11	5,372	8	5,594	13	15,096	3	10,326			6	$7,008		
Esthonia					1	1,163								
Finland							1	2,466						
France	1	300	7	4,628	10	12,017	5	15,204	4	1,982				
Germany	1	250												
Gibraltar	18	6,542	1	716					4	1,680				
Greece	8	3,800	4	2,887	6	9,469								
Iceland and Faroe Islands														
Italy	208	58,549	5	2,561	1	1,500			65	17,510				
Malta, Gozo and Cyprus	8	3,438	2	1,010	4	4,254								
Netherlands	2	616	18	13,885	39	43,769	7	21,231	1	935				
Norway	7	3,158	13	8,365	26	32,342					4	7,853		
Poland and Danzig			3	2,032	2	2,082			1	383				
Portugal	55	20,740	2	1,532	13	14,728	1	3,651	8	3,358				
Rumania					1	1,500	2	4,932						
Russia			2	1,196			2	7,272	50	21,000				
Spain	210	86,627	142	90,367	128	141,710	20	43,894	68	18,635	7	5,919		
Sweden	54	21,130	62	44,238	87	94,978	3	8,180	3	2,538	2	3,710		
Switzerland			7	4,634	22	23,290	1	2,600						
Turkey														
England	37	16,227	59	37,539	36	38,469	16	41,779	30	20,322	23	19,989	5	$5,930
Scotland														
Ireland	1	150												
Yugoslavia														
North and South America														
United States														
Canada	110	25,199	182	118,273	267	295,486	37	100,227	11	6,504	57	79,499	9	33,729
British Honduras			4	2,519					1	687				
Costa Rica	3	1,000	3	2,148	3	3,500					1	2,725		
Guatemala			1	685	13	13,592								
Honduras	4	1,556			1	1,700	2	5,356	2	1,100			3	14,345
Nicaragua					1	1,232								
Panama	9	3,312	3	1,525	16	18,670			6	2,184				
Salvador			3	2,148	5	5,434								
Mexico	291	99,222	65	43,796	69	70,350	11	44,214	57	23,444	2	4,791	3	950
Miquelon, Langley and St. Pierre														
Newfoundland and Labrador			1	710	5	5,681								
Barbados	8	2,995							2	494				
Jamaica	12	4,395	11	7,876	6	6,531			11	4,040	8	11,616		
Trinidad and Tobago	16	5,697			2	2,402								
Other British West Indies	4	1,555			1	1,800			4	1,371				
Cuba	398	103,264	31	22,222	45	57,081	13	30,810	59	15,967			5	15,562
Dominican Republic	65	22,619	15	9,102	12	15,333	1	3,500	13	5,168	1	1,015	1	4,427
Dutch West Indies	1	298												
French West Indies														
Haiti	2	674	4	2,864	5	5,631								
Virgin Islands														
Argentina	261	123,406	225	121,185	298	290,732	22	65,494	8	8,208	13	25,040	5	10,440
Bolivia					2	2,187			2	324				
Brazil	11	5,390	3	2,344	102	101,087	3	9,000	1	450				
Chile	8	2,376	10	6,852	22	24,464	2	5,400	41	21,751	4	5,103		
Colombia	11	4,181	3	2,048	5	6,215			3	2,008	4	9,328	3	12,762
Ecuador														
British Guiana	9	3,141			3	3,258								
Dutch Guiana														
Peru	15	5,360	8	5,971	16	17,550			40	16,056				
Uruguay			29	16,065	42	50,627	8	21,327						
Venezuela	17	6,313	2	1,390	31	15,562	3	7,107	7	2,548				
Asia														
Aden														
British India	118	48,372	15	9,156	25	26,025			7	8,887			2	2,372
Ceylon	5	2,375			5	5,779			4	4,828				
Straits Settlements	40	19,282			13	28,428								
China	33	11,023	23	14,433	25	29,853	2	5,134	20	7,926				
Chosen	6	2,881			3	3,796								
Java and Madeira					26	29,591								
Other Dutch East Indies					4	3,672								
French Indo China	6	2,200							3	992				
Hejaz, Arabia and Mesopotamia	12	4,493									4	4,743		
Hongkong					5	5,141	3	6,825			226	102,352		
Japan	328	105,289	21	13,008	26	27,569	1	2,013						
Kwantung	2	940			1	1,150								
Palestine Syria	40	11,187	10	7,160	10	9,703								
Persia														
Philippine Islands	16	6,060	11	8,635	19	22,616			23	11,800				
Siam														
Turkey														
Oceania														
Australia	762	315,031	558	376,147	726	774,226	26	55,768	119	83,995	132	174,062	5	15,227
British Oceania									1	150				
French Oceania	1	250	1	650					1	441				
New Zealand	95	44,072	56	41,898	214	227,406	2	5,374	14	15,641	23	38,985	14	36,854
Other Oceania														
Africa														
Belgian Congo														
British West Africa					4	3,574			28	29,784	9	8,469		
British South Africa	54	23,150	32	21,677	282	261,972	1	3,900	1	1,053	2	2,574		
British East Africa	9	3,749			2	2,016								
Canary Islands	9	4,093	2	1,336	17	19,552								
Egypt	32	9,129	7	3,995	1	1,311								
Algeria and Tunis	9	2,849							2	728				
Other French Africa	2	590	3	2,148										
Italian Africa														
Morocco	10	3,744	1	628					4	1,600				
Portuguese East Africa	3	1,292							1	520				
Other Countries														
Total	3,750	$1,369,569	1,684	$1,096,132	2,775	$2,941,794	202	$547,319	1,063	$452,626	528	$514,781	55	$152,586

August, 1923 | Canadian Exports

Electric Vehicles		Parts	Tires						Passenger Cars		Trucks		Parts	Countries
			Casings		Solid		Inner							
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
														Europe
		$371												Austria
														Azores and Madeira Islands
		162,142	279	$5,101			589	$1,263	20	$12,665			$138	Belgium
									2	785				Czechoslovakia
		278,758	3,209	40,090	87	$3,230	1,279	2,438	8	6,276			5,005	Denmark
		87	140	2,570			170	412						Esthonia
		212	542	9,172			457	1,053						Finland
		261,472	514	7,646			8	53	1	48				France
		629							5	2,356				Germany
		2,062	4	63	4	68								Gibraltar
		5,765	204	2,685	51	1,751	240	714	4	2,062				Greece
		155	69	842			130	195						Iceland and Faroe Islands
		6,272	1,209	14,150										Italy
		299												Malta, Gozo and Cyprus
		28,687	2,212	27,965	10	195	1,719	2,616	9	10,680			128	Netherlands
		43,024	2,581	44,515	71	2,621	3,220	5,548	4	4,200			148	Norway
		1,752	10	144										Poland and Danzig
		4,910	376	4,926			273	443	6	7,917			126	Portugal
		132												Rumania
		11,529	241	2,186			1,077	2,349						Russia
		151,906	1,758	30,176	790	21,785	2,125	3,656	5	7,483			5,675	Spain
2	$3,500	46,137	1,913	30,447	134	3,465	1,870	2,909	21	19,194			146	Sweden
		1,518	749	12,090			528	1,229						Switzerland
		911												Turkey
		452,961	13,549	184,589	3,419	69,957	3,790	6,420	275	168,644	288	$126,486	28,951	England
		38	4	251	24	748	6	28						Scotland
		5,321	373	4,777			485	730						Ireland
		245												Yugoslavia
														North and South America
									15	4,475			64,537	United States
1	900	1,225,053	6,394	68,767	118	6,168	1,556	2,521						Canada
		317	4	54			22	29						British Honduras
		3,696	81	2,081			87	240						Costa Rica
		2,054	77	1,422	7	170	89	238	2	2,090			80	Guatemala
		4,560	158	3,553	70	3,417	122	274						Honduras
		225	6	88	4	132								Nicaragua
		6,855	665	6,835	20	388	507	920					19,821	Panama
		470	36	540	4	208	64	124						Salvador
		115,241	4,198	63,014	60	2,216	6,111	11,471	8	9,500				Mexico
					6	172								Miquelon, Langley and St. Pierre
		1,361	112	1,470			137	292	3	1,592			217	Newfoundland and Labrador
		2,429	19	199	12	255	28	42						Barbados
		13,146	532	6,037	32	540	736	1,152						Jamaica
		6,983	146	2,575	18	520	97	345						Trinidad and Tobago
		1,576	107	1,158			50	92	13	8,518			31	Other British West Indies
		83,299	5,217	60,227	840	20,943	9,172	14,579						Cuba
		13,039	846	8,541	101	2,765	1,315	2,326						Dominican Republic
		828	79	687			96	126						Dutch West Indies
		1,043	48	523			18	37						French West Indies
		9,289	224	4,181			504	917						Haiti
		531	15	170			30	31						Virgin Islands
1	650	706,935	5,022	63,881	22	652	6,626	9,988	24	13,652			12,954	Argentina
		1,810	30	552			15	19						Bolivia
1	6,505	199,741	992	10,285	97	1,883	1,195	2,036	1	1,243				Brazil
		20,413	1,074	14,637	20	509	545	969	8	10,310			60	Chile
		10,510	551	8,757	9	313	750	1,639	4	3,569			76	Colombia
		584	189	3,174	6	137	160	356	1	1,002				Ecuador
		338			6	102			9	4,537				British Guiana
		229	6	68			8	9						Dutch Guiana
		22,244	820	9,954	49	1,302	617	1,566						Peru
		16,989	945	13,827	8	317	1,011	2,354	19	12,527			141	Uruguay
3	15,280	7,686	664	7,177	8	185	403	924	3	4,136				Venezuela
														Asia
													287	Aden
		21,160	1,018	11,403	272	6,842	1,705	2,768	364	142,301	50	16,701	17,798	British India
		1,400	56	897			57	110	46	19,676	16	5,344	6,889	Ceylon
		25,336	374	3,976	118	2,536	88	152	106	41,232	12	4,008	11,534	Straits Settlements
		5,486	716	7,603			570	834	6	5,862				China
		10,977	24	260			24	45						Chosen
		22,050	490	6,095	43	1,149	436	816						Java and Madeira
		5,167	12	200	38	869	146	241	222	87,081	4	1,336	13,648	Other Dutch East Indies
		681	24	180			24	27						French Indo China
		1,303	160	1,942			120	220						Hejaz, Arabia and Mesopotamia
		5,929	35	554			44	66	4	5,648				Hongkong
		115,041	6,118	68,252	454	7,632	2,730	4,450	41	40,336				Japan
		6,333	80	1,157										Kwantung
		6,495	1,027	11,150			623	1,814	1	1,398				Palestine and Syria
		592			10	297								Persia
		13,876	5,337	56,503	215	4,028	3,494	6,168						Philippine Islands
		110							21	7,265	14	4,676	349	Siam
		1,780												Turkey
														Oceania
		230,315	4,826	63,393	794	22,666	3,424	7,957	1,220	398,451	941	307,775	37,804	Australia
		1,100	88	779			47	84						British Oceania
		1,267	6	52	10	457								French Oceania
		53,569	2,725	36,732	439	16,907	876	1,886	816	316,663	108	36,072	9,819	New Zealand
		1,635	105	1,186			143	251						Other Oceania
														Africa
		111	52	545										Belgian Congo
		9,862	336	6,177			306	871	35	11,459	15	8,032	5,626	British West Africa
		59,758	2,033	21,175	91	2,293	3,547	6,242	866	319,583	24	8,016	42,830	British South Africa
		2,767	386	4,584			213	283	16	7,054	8	2,672	1,397	British East Africa
		1,318	329	4,209	82	1,759	135	221						Canary Islands
		7,996	574	4,225	85	1,803	188	1,126	2	1,414				Egypt
		43	75	936										Algeria and Tunis
		871												Other French Africa
		16												Italian Africa
		1,696	28	739			26	55						Morocco
		4,389												Portuguese East Africa
									8	6,452			241	Other Countries
8	$26,835	$4,567,198	86,227	$1,104,323	8,758	$216,352	69,003	$124,359	4,242	$1,730,358	1,480	$521,118	$286,239	Total

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Design Items Which Affect Service

ALMOST everybody recognizes in the abstract that easy servicing is an exceedingly important item in helping to establish good-will upon which future sales in general depend, but there are still many instances to be found in which it appears that the designer has disregarded service requirements.

A case in point was recently brought to our notice by a man who follows service station methods and appreciates the service man's point of view. This had to do with an apparently inconsequential item—the angle of valve seats. About 99 per cent of car and truck manufacturers use 45 deg. seats, but the other 1 per cent stick to a 30 deg. seat.

When valves were invariably ground by hand, the valve seat angle did not matter so much, but now that most of the large and many of the small shops employ refacing machines and reamers, these tools must be made adjustable or be duplicated in order to handle both seat angles. This is said to add about 50 per cent to the cost of the tool equipment and certainly adds to the chance of inaccurate work.

It happens that 30 deg. valve seats have one slight advantage in that they require a trifle less lift for a given area of opening, but no one will question that it is possible to attain entirely satisfactory results with 45 deg. seats. Still, some engineering departments continue to specify the former without apparent recognition of the service complication which results. This is not an isolated case but is characteristic of many similar conditions.

One fairly obvious reason for this situation is a general lack, among engineers and production men, of familiarity with or disposition to ignore service conditions. Probably most automobile and truck makers have in their organization men who are thoroughly familiar with service conditions and requirements, but too often the information they possess is not placed before the engineering and manufacturing departments in such a way that its effect is seen in later products. Men in authority in these departments could spend profitably every year a few weeks away from the plant studying service conditions.

Balloon Tires to the Fore

CONSIDERABLE progress has been made in the past few months in the development of balloon tires, and it is claimed that the few faults which originally were apparent or were anticipated either have been overcome completely or did not materialize as predicted.

It is understood that the chief factor which stands in the way of further progress at the moment is the failure of tire and rim makers to agree upon standards of size, especially rim diameters and widths. An effort is being made to bring together the Tire and Rim Association, the Rubber Association of America, the National Automobile Chamber of Commerce and the Society of Automotive Engineers, with a view to arriving at mutually satisfactory standards, and one prominent British tire and rim manufacturer is now in this country in the hope of bringing about international standardization.

Some tire companies are inclined to favor a 20-in. and some a 22-in. base rim. There is a similar lack of agreement in regard to rim widths and contours. Those who favor a comparatively wide rim say that it is necessary to give stability or freedom from side sway and "shimmying" and there probably is good ground for this contention. On the other hand, the narrower rim is lighter and correspondingly less expensive, which is an important factor.

Low first cost must not be overlooked, but of greater importance is satisfactory performance. Rims which have proved too narrow in the past have had to be widened later at considerable expense and with considerable grief incident to odd sizes and altered standards. It is to be hoped that similar mistakes will not be made in this case. Possibly the smaller diameter of rim in combination with a width sufficient to insure stability will also result in a desirable degree of weight and cost saving.

Whether or not the public, having had a taste of balloon tires, soon will accept nothing else, it is important that all the interests concerned adjust their differences and prepare to meet potential heavy demand for the new sizes of tires, rims and wheels.

Fear of Impending Business Break Is NOT Justified

PARTS makers who are members of the Motor and Accessory Manufacturers Association report a surprising increase in past due accounts in September while the volume of their business declined less than 10 per cent. The most plausible explanation is that vehicle manufacturers who buy from them are conserving their liquid assets and deferring payment of merchandise creditors as long as possible. While the amount involved is not large, even in the aggregate, this situation is not one which can be called gratifying.

Conservation of assets is the part of wisdom at any time, provided it is not done at the expense of some one else. It is peculiarly wise when there is doubt about the future course of business. Prosperity rests on confidence, however, and the surprising factor in the present situation is that business is so good when so many persons are lugubrious about the outlook.

Ever since the brakes were applied last March, thus averting another period of inflation, prophets of evil have been bewailing the slowing up and predicting the collapse of business. If they raise their voices long enough and loudly enough they may bring it about.

There has been a not inconsiderable decline in the volume of automotive sales in the last two or three months, but it has been nothing to become hysterical about. It was fully expected three months before it began. As AUTOMOTIVE INDUSTRIES has pointed out before, if no motor vehicles at all were sold for the rest of 1923 it still would have been the banner year in history. Let us hope devoutly that the industry will be cautious but that it will not be temperamental.

Those companies, with a few exceptions, which have been hoping that 1924 will be a bigger year than 1923 probably will be disappointed. Why should it be? It was scarcely to be expected that the American people would go on indefinitely buying automobiles at the rate of 350,000 a month. Optimism should be tempered with reason just as pessimism should be leavened with common sense.

The worst that can be said of general business today is that it is proceeding on a fairly even keel. There are no pronounced trends either up or down. The same has been true for weeks past. Perhaps that is the reason there has been so much gloom. American trade and industry have become accustomed to curves which either rise or fall sharply and apparently they have been mystified by a curve which doesn't curve but runs along in a straight line.

There are several anomalous features in the production situation. Volume of output appears to be doing little more than holding its own, but retail sales are large and well sustained. Car loadings, which indicate distribution, are still running around 1,000,000 a week. Such a condition is undoubtedly perplexing because it would not seem that distribution would continue at high levels while production was decreasing.

Examination of car loadings for September shows that the increase was not due to crop movements, as might have been expected, but rather to an increase in the movement of merchandise and miscellaneous freight, which includes finished products.

It is quite possible that the volume of production in virtually all lines has been larger than the pessimistic reports with which the air has been filled would indicate. Much has been heard, for example, of distressing conditions in the cotton industry, but the facts show that they must have been exaggerated. A new high mark was set in April of this year, when 35,515,791 spindles were in operation. The number in operation in September had declined to 33,929,885, a scarcely appalling decrease of 1,585,906, in view of the fact that in January, 1920, when it was not denied that business was extraordinarily good, the number in operation was 34,739,579, or only 808,694 more than last month. The low point for a decade was December, 1920, when 29,914,154 spindles were in use. The cotton industry still has a long distance to go before it can sink into a slough of despond.

What is true of cotton probably is true in other lines. There still is little unemployment and as long as the American people are hard at work, with wages as good as they are now, there can be no hard times.

While the production situation is somewhat beclouded, we believe that the next few months will witness a continuation of activity at a high level without a strong trend either upward or downward. That condition probably will prevail until business goes into the quadrennial twilight sleep brought on by a pending presidential election. In the meantime commodity prices are likely to remain stable or decline somewhat.

We can see nothing on the horizon as yet to cause apprehension for the automotive industry so long as it proceeds sanely and is not obsessed by a desire to push production and sales beyond reasonable levels. J. D.

First Week Reports Promise Good Month

Indicated That Output in October Will Be Greater Than It Was in September

NEW YORK, Oct. 22.—Reports for the first week of October indicate that the number of cars and trucks produced during the month will go beyond the 328,000 figure estimated for September. This follows the curve of production a year ago and reverses conditions in 1921, when October dropped behind September. Output in October of last year was 239,191, as against 206,994 in the preceding month.

Plants are operating on relatively high schedules with no attempt being made, however, to approach the production records of the spring months. The production situation is entirely normal and, like that in the sales field, is far better than a year ago. No more than the customary slowing up in either sales or plant operations is looked for for the remainder of the year. It is not to be expected that the last quarter will see the same volume of sales that featured the spring or summer months nor is it within reason to believe that manufacturers as a whole will endeavor to reach capacity operations.

The industry is in a healthy condition both at its production centers and in the retail demand for its output and anticipates steady production and sales until the first of the year, when there will come a pronounced picking up.

Strong Move in Exports

While domestic sales continue steady there is a strong upward trend evident in export business, particularly with those countries south of the equator which are now entering the summer season. The present situation and the promising outlook in those countries meet the general expectation of American producers.

In addition, more optimism prevails in export prospects as a better tone is given to European affairs because of the general effect that a settlement of the difficulties will have on all countries absorbing American automotive products. The expanding foreign market will afford an outlet for any surplus of cars and trucks that may accumulate during a lull in the American market.

Orders are reported received from Japan, one of them calling for 1000

(*Continued on page* 865)

Business in Brief

NEW YORK Oct. 23—Rains in the South and Southwest and warm weather in the North and East have affected conditions in both trade and industry, rendering the general situation spotty. There seems to be some worry over price uncertainties, particularly in textiles, but nevertheless current sales and output stand comparison with last year at this time.

There is considerable activity in the lumber trade on the Pacific Coast, and the steel industry advises of some buying on the part of Japan.

Good business is reported in Eastern jewelry manufacturing, Western shoe manufacturing, women's wearing apparel and in the Southern cotton goods industry. New Jersey is suffering industrially because of the water shortage, which has shut down or slowed operations in many plants.

In the iron trade weakness is shown in pig iron and scrap, while furnace coke is the lowest in several years. Steel prices are unchanged, and there is some little railroad business in the way of rails and track fastenings. Fabricated steel orders show activity. Bituminous coal is sluggish, but anthracite is active.

Crop reports seem satisfactory, with marketing of grains below the average for this season, especially of wheat and corn. Oats is somewhat above the average, while farmers show a tendency to hold their crops. Cattle, hogs and sheep are plentiful, and in consequence of heavy arrivals values have been depressed.

Car loadings have decreased 17,584 from the previous week, a total of 1,079,690 being reported for the week ended Oct. 6. This, however, is a gain of 126,438 for the same week last year and 180,609 over 1921. For the forty weeks of this year the grand total is 37,689,581, against 32,267,791 last year.

Ford Plans Laboratory for Johansson Gauge Co.

POUGHKEEPSIE, N. Y., Oct. 25—Henry Ford's plans for the development of the Johansson Gauge Co., which he recently acquired, include the building at Dearborn, Mich., of one of the greatest laboratories in the world, which will be in charge of Carl Johansson and Carl Willenius.

Johansson will be here Friday to superintend the installation of $100,000 worth of machinery in the local plant, which the Ford company purchased.

Railroads in Japan Buying Trucks Here

But Government Itself Has Not Entered Market, Excepting Possibly for Fords

NEW YORK, Oct. 22—Rumors that the Japanese government has come into the market and placed orders for American built trucks are apparently without foundation. If anything of the sort has been done it undoubtedly is confined to the Ford Motor Co., one statement heard here being to the effect that 1000 Fords had been bought by the city of Tokio.

American truck builders, however, are securing some Japanese business, as was evidenced by the placing of an order for 150 two-ton trucks by H. Hattori, representing the Japanese Government Railways in this country. Hattori has bought fifty Macks, fifty GMCs and fifty Pierce-Arrows for railroad use.

Before the earthquake the railroad had about 100 trucks in service but most of these were destroyed. The new trucks will be utilized in transporting freight and merchandise between Tokio and Yokohama, filling in gaps caused by the destruction of sections of the tracks.

Representatives of Hittori, who is located at 1 Madison Avenue, New York City, say that they are through buying at the present time. They do not expect a big demand for trucks in Japan because of the poor roads in the country districts.

General Committee Rumored

Information reaching some of the exporters in New York this week was to the effect that a central purchasing commission would be established by the Japanese government here, in connection with the Embassy at Washington and with offices in New York. Although this could not be confirmed, it was stated that action on it could not be expected until after the meeting, early in November, of the Japanese Diet, when the entire subject of Japanese purchases would be considered.

The commission to be established here would centralize all government purchases, it was said, and trucks and other automotive equipment for the government would come through it. The commission probably will not interrupt in any way the private purchases that are being made, but the probability was expressed that no more official buying will be done, either on behalf of the government or other official organizations until after the Diet has had its meeting.

16,000 MOTO-METER STATIONS

LONG ISLAND CITY, Oct. 24—The Moto-Meter Co., which adopted a service station policy more than a year ago for the distribution of its product, now has 16,000 official service stations covering virtually all sections of the country.

Old Company Plans New Motor Products

Dispels Rumors of Consolidation —Stockholders Will Act on November 7

DETROIT, Oct. 24—Stockholders of Motor Products Co. are to act at a special meeting, Nov. 7, on a plan to reorganize the company as the Motor Products Corp., by which the new company will be capitalized on the assets of the present company.

The plan has been communicated to stockholders by President D. B. Lee and is reported to have been approved by two-thirds of them, and being practically certain of becoming effective. Announcement of the plan has resulted in the stock creating new high marks on the Detroit exchange.

The new company will have a capitalization of 62,500 shares of preferred and 67,500 shares of common. The preferred will pay $4 a year and have liquidation and redemption value of $50 and accrued dividends. There will also be 6,750,000 6 per cent twenty-year sinking fund gold bonds.

The present company has outstanding 62,500 shares of no par value stock, consisting of 57,500 class A shares and 5000 class B shares.

It is proposed that the new company acquire the assets of the present company by the exchange of $100 in bonds for one share of preferred and one share of common for each share of stock now outstanding. In addition, the class B shares will receive another $100 bond for the surrender of voting power. This will leave 5000 shares of common in the treasury, which will be distributed among employees in a way to be worked out later. The new company will be organized under New York State laws.

Announcement of the company's plans ends a period of speculation which gave rise to the report that the company was to be merged either with General Motors or other important companies. The stock has been greatly in demand as a result of the rumors and the strong financial position of the company.

Big Service Problem Is to Convince Smaller Dealer of Need for Carrying Good Stocks of Parts

AN INTERVIEW WITH C. E. SALISBURY,
Service Manager of the Hupp Motor Car Corp.

By D. M. McDonald,
Detroit News Representative of the Class Journal Co.

Detroit, Oct. 23.

SERVICE problems as they affect the larger producing companies in the industry will disappear in the course of the next two or three years through the influence of production volume, and through the development of thorough cooperation between the factory and its distributing organization.

With a constantly increasing number of cars in his territory to service and with a greater number of transients to provide for, a dealer in even the smallest communities will become convinced of the business possibilities of maintaining parts stocks, and of having facilities in his shop for their installation.

Convincing the smaller dealer of the desirability and necessity for constantly maintaining adequate parts stocks is the most important problem that the factory service manager has to meet, said C. E. Salisbury, service manager of the Hupp Motor Car Corp. Next to this comes the work of training dealers to operate their shops under flat-rate systems and to provide them with tools so that they can do this efficiently.

With the greater volume of sales that many of the companies are attaining and the consequent greater number of cars in all territories, dealers, for the most part, are maintaining required stocks, but there are still many who delay the owner two or three days while they get parts from the nearest source.

The fullest development of the flat-rate system will not come until all dealers have a sufficient volume of service business to warrant equipping their shops for all operations, but in the meanwhile there is much improvement that can be made in ordinary tool equipment and methods of work.

Throughout the industry today we find the subject of service holding an uppermost place. Specially trained factory men are in touch with field conditions, and distributors are working among their dealers to bring each individual shop to its highest efficiency.

There is a great deal of good work that distributors can do that is difficult for the factory man to do because of greater intimacy with the territory and its needs, and for this reason we are urging our distributors to give a large measure of attention to improving service among their dealers.

Factory service conventions are going a long way toward making service all that it should be throughout the country, Mr. Salisbury said. They also are an important feature in making the car better, he said, for it often happens that a service man on the firing line will discover something that can be corrected or improved, and by bringing his ideas to the factory much important work can be done. The exchange of views developed at a factory service convention is invaluable, and it rarely happens that there isn't something brought to light that will make the car better and improve its servicing.

Proper service methods also are having the effect of making owners familiar with the details of the construction and materials used in their cars, and in this way are proving an important asset both in making sales and keeping cars sold. This is accomplished by use of parts boards and other methods of display, he said. There are many other ways in which service plays an important rôle in the general plan of the automobile trade, and undoubtedly the next two or three years will see it reaching the perfection that it must have if the industry is to make sound progress.

Stockholders Organize Victor Page Committee

NEW YORK, Oct. 24—More than 100 stockholders of the Victor Page Motors Corp. of Stamford have formed a protective committee, headed by Thomas Graham.

It is claimed that the corporation and its subsidiaries have sold more than $1,500,000 worth of stock in the last three years, and while a factory has been built at Stamford and several sample cars produced, the stockholders have received no dividends.

The stockholders assert nothing is being done with air-cooled engine patents the company holds, and they will investigate the situation. The membership in the committee represents holders of 78,041 shares of stock, it is said.

ASKS ACE MOTOR BANKRUPTCY

PHILADELPHIA, Oct. 22—Three creditors of the Ace Motor Co. have filed a petition in bankruptcy, claiming the corporation is insolvent. No statement of liabilities and assets is made in the petition, but in the bill in equity on which the equity receivers were appointed Sept. 20, the assets were placed at about $1,300,000 and the liabilities at $1,141,666. The company makes motorcycles.

Rubber Products Rates Cut to Pacific Coast

NEW YORK, Oct. 24—A reduction of rates on rubber products to Pacific Coast ports has been secured from the Eastern carriers by the traffic committee of the Rubber Association of America. The old rates applying on shipments via all-rail have been approximately $3.32 per 100 lb., depending upon the point of origin.

As a result of the negotiations, the Eastern lines have agreed to reduce this rate to $3 per 100 lb., a reduction of 9.6 per cent. The new rates will be in effect in about sixty days.

Rickenbacker Plant Enlarging Capacity

With Changes, Company Will Be Prepared to Build Only 4-Wheel Brake Model

DETROIT, Oct. 22—Alterations of present buildings of the Rickenbacker Motor Co., consisting chiefly in the addition of stories at certain points to permit more convenient handling of materials, will give the company capacity for approximately 100 cars a day by Jan. 1, as compared with present capacity of about sixty. About 60,000 feet will be added.

Co-incident with the completion of the factory changes, the company will be prepared to build only four-wheel brake cars, a point toward which it has been directing its merchandising effort since the first four-wheel brake cars were announced. At the start the four-wheel brake output was held to about half the total, so that dealers would have both types of cars while the four-wheel educational work was done. Present four-wheel brake output is about 85 per cent of the total.

By constructing additional stories at vantage points about the assembly floor, the factory will be enabled to drop its bodies and stampings from above, looking toward more efficient operation and giving much more space on the assembly floor for manufacturing operations. The one-story construction of the general factories will be maintained except at the points where the car is completed.

The Rickenbacker company by its connection with the Trippensee Closed Body Corp., which was formed recently by the combination of the Trippensee Manufacturing Co. and Everitt Bros., is assured of a complete supply of bodies of all types.

A study of the foreign field is now being made by the Rickenbacker company preliminary to the opening of an export sales campaign.

Bumpers Built by Cox to Carry Eaton Name

CLEVELAND, Oct. 22—Bumpers made by the Cox Brass Manufacturing Co. since 1909 and known as Cox, Hylo, Endurance and Gard-All bumpers, will hereafter be called Eaton.

This change, it is announced by the Eaton Axle & Spring Co., which recently took over the Cox company, is for the purpose of simplicity and to avoid a confusion of too many different names and trademarks.

HOWARD P. WOODWORTH DEAD

DETROIT, Oct. 20—Funeral services for Howard P. Woodworth, head of the Union Motor Truck Co. of Bay City, were held yesterday. Mr. Woodworth died from the effects of injuries suffered when his automobile was struck by a freight train Saturday. Forming the Union company in 1915, Mr. Woodworth held the position of vice-president and had been in charge of its affairs from the start, reorganizing the company about a year and a half ago. He was connected in an executive way with the Republic Truck Co. of Alma during the Ruggles regime, leaving that company to form his own. He was forty-two years old and was born in Suffield, Conn.

Waltham Watch Products to Be Sold from Detroit

DETROIT, Oct. 23—The Waltham Watch & Clock Co. of Waltham, Mass., has opened an office in the General Motors Building, in charge of R. C. Getsinger and C. L. Fox. All sales of its automotive equipment, including automobile clocks and speedometers, in the future will be handled for the entire country from the Detroit office.

Getsinger formerly was sales manager and Fox assistant sales manager of the Lincoln Motor Co. After purchase of the Lincoln by the Ford Motor Co., they remained with the organization until Jan. 1, when they organized the Getsinger-Fox Co., specializing in the sale of equipment. Taking over the Waltham account is in line with their program announced a year ago.

The Waltham watch line is being handled in connection with several other lines by special equipment for the automotive industry, including the Fleetwood body line.

Ford Motor of Canada Renames All Directors

DETROIT, Oct. 23—Directors of the Ford Motor Co. of Canada were reelected at the annual meeting this week as follows: Henry Ford, W. R. Cambell, Edsel B. Ford, E. C. Kanzler and George E. Dickert. A new office of third vice-president was created by the directors, Dickert being elected to that position. E. B. Greigg was appointed assistant secretary. The other officers, all re-elected, are Henry Ford, president; W. R. Cambell, vice-president and treasurer, and Edsel B. Ford, second vice-president.

A 10 per cent cash dividend was declared payable Nov. 15, this being the first dividend paid this year. In the two previous years the company paid 30 per cent in cash dividends. During the company's last fiscal year, with net profits of $5,106,197, its plant investment showed a net increase of $5,548,364, and it was estimated that approximately $4,800,000 would be required to complete extensions under way at the end of the fiscal period.

BULL DOG PLANT VISITED

GALENA, ILL., Oct. 20—The Bull Dog Motor Truck Co., manufacturing a four-wheel drive truck, was formally launched this week when 200 stockholders visited the local plant of which B. J. Patrick is superintendent. The plant has 15,000 sq. ft. of floor space.

Third of Fords Made Now Are Closed Type

Percentage Increases Over 1922 —Coupe Proves to Be Most Popular Model

DETROIT, Oct. 22—Production figures have been announced showing that one-third of the passenger cars being built by the Ford Motor Co. are closed models, which means more than a 4 per cent increase over 1922.

In 1921 this percentage was 25.7, in 1920, 18.9 and in 1919, 11.7. The coupe is the most popular model, it being expected that this year it will approximate 66 2/3 per cent of Ford's closed car output. Three years ago 41 per cent of the total Ford closed car output were coupes, while last year it jumped to 56.5 per cent.

At present 800 coupes a day are being turned out, but when manufacturing schedules can be arranged this will go up to 1700 daily. The demand for this model is such that deliveries cannot be made until sixty days after the order is placed.

The following table shows the Ford closed car production for five years:

	Sedans	Coupes	Total Car Output	Percentage Closed Cars
*1923	190,000	380,000	1,710,000	33.3
1922	160,000	160,000	1,100,000	29.0
1921	129,287	95,682	875,000	25.7
1920	109,487	75,948	977,000	18.9
1919	48,318	33,771	700,000	11.7

*Estimate based on nine months production.

It is announced that on Oct. 17 domestic production for 1923 passed the 1,500,000 mark. From Jan. 1 to last Wednesday total production of both cars and trucks was 1,500,696, or an increase of 564,774 over the same period in 1922.

Ford Output for Week

DETROIT, Oct. 20—Ford production totals for the week ending Oct. 16 were: Cars and trucks for domestic sale, 41,227; tractors, 1841; Lincoln, 215. This was a new weekly production mark for Lincoln.

Service Heads Will Meet at Dayton, Nov. 20-21

NEW YORK, Oct. 22—The factory service managers' meeting, scheduled by the National Automobile Chamber of Commerce for Nov. 13 and 14 at Dayton, Ohio, has been made a joint affair through the action of the Society of Automotive Engineers, in joining forces with the Chamber.

The dates have been advanced to Nov. 20 and 21, largely because the earlier dates clashed with the arrangement of the Automotive Equipment Association, which will hold its meeting in Chicago on Nov. 12-17.

Both engineers and service managers are expected to attend the session at Dayton.

International Balloon Tire Standard Sought

British Dunlop Feels Exports Will Be Helped by Standardized Sizes

NEW YORK, Oct 22—Colin Macbeth, experimental engineer of the Dunlop Rubber Co, Ltd, of Birmingham, England, is now in this country for the primary purpose of bringing about, if possible, uniform international standards covering the dimensions of balloon tires and rims to be used in connection with them.

He is convinced that such standards will be beneficial to tire and rim manufacturers both in this country and in England and will help promote sales in those countries with which both Great Britain and the United States do an export business. It is said that if sufficient interest in the proposed standardization program develops, a special meeting of the Tire and Rim Association will be called to consider it.

Sees Growth in Its Use

Macbeth believes that low pressure tires, as he prefers to call the balloon type, will rapidly supersede the present cord and fabric varieties once standard sizes are decided upon and put into production. The Dunlop company desires an understanding with American tire and rim makers while the subject of dimensions is still under discussion in this country, in order that the tires turned out here and in England may be interchangeable.

It is understood that Dunlop controls the tire and rim situation in England so far as dimensions are concerned and is much in favor of the type of rim with a circumferential well, a development of the old Dunlop-Welch cycle rim, which was described in AUTOMOTIVE INDUSTRIES last week. While this rim can be made demountable it is considered unnecessary to make it so for the reason that the use of the well construction is said to render it possible to change tires in less than a minute without the use of any tools.

Construction of Dunlop Tire

Dunlop low pressure tires have a special bead construction incorporating a safety rib of rubber which rests on the edge of the rim and prevents the tire from coming off and is said also to prevent injury both to the tube and casing even though the tire is allowed to run flat for considerable distances. It is claimed that this tire and rim construction has undergone severe tests in which tires have been cut intentionally at high speed without accident to the car. Punctures also are said to be less frequent than with conventional tire construction, a full thickness of tread being retained.

Dunlop is understood to be willing to grant licenses to American tire and rim makers under the patents on this tire and rim construction without payment of royalties providing due credit is given it for features which it claims to have originated.

Dunlop plans to standardize on a rim of 20-in. base diameter and prefers a wide base on account of the great stability or freedom from side sway which it is said to afford as compared with a narrower rim. Sizes which it is planned to market include 30 x 5, 32 x 6 and 36 x 8 in., the last mentioned being recommended for the largest size of passenger cars now built. An advantage of the Dunlop rim is the facility with which it lends itself to a valve which projects through the rim at an angle. This is said to shorten the valve stem required.

Europe Uses 3,000,000 Tires Yearly

NEW YORK, Oct. 22—Charles E. Speaks, general European representative of the Firestone Tire & Rubber Co., here on his annual business trip, estimates that Europe is using 3,000,000 tires a year. American manufacturers are getting from 40 to 50 per cent of the business in Scandinavia and 15 per cent elsewhere in Europe.

Speaks is expecting higher tire prices in Europe for American tires owing to exchange conditions, for American manufacturers either must increase their prices or lower the quality to compete with European makers.

At present tires cost from 5 to 20 per cent more in Europe than in America. Speaks believes that England will not put a duty on American tires for the present at least.

Wisconsin Papers Filed by Amalgamated Motors

MILWAUKEE, Oct. 22—Articles of incorporation have been filed in Wisconsin by the Amalgamated Motors Corp. of Milwaukee, authorized capital $1,000,000.

The purpose is to operate and finance the new Winther Motor Co. of Kenosha, Wis., a $500,000 Wisconsin corporation formed by the stockholders' protective committee which purchased the assets of the defunct Winther Motors, Inc., of Kenosha, for $130,000 a short time ago.

The Winther company is becoming part of a merger of a number of truck and parts companies, including the Bessemer Motor Truck Co. of Grove City, Pa., the American Motors Corp. of Plainfield, N. J., and Northway Motors Corp. of Natick, Mass.

Northway Stockholders to Act

NATICK, Mass., Oct. 22—A notice has been sent to the stockholders of the Northway Motors Corp. to meet at the factory here on Oct. 29 to vote on the plan for becoming a part of the Amalgamated Motors Corp.

John M. Mack, who has been prominent in the affairs of the Northway corporation recently, will be one of the managers of the new merger corporation if the stockholders approve of the plan.

Plan for Coast Tire Awaits Tax Payment

Retirement of J. B. Lanktree as Receiver Delayed by Claim of Government

OAKLAND, CAL., Oct. 20—Demand by Federal officials for payment in full of $11,924 in taxes by the Coast Tire & Rubber Company, has delayed the retirement of J. B. Lanktree as receiver of the company.

Lanktree appeared before Superior Judge Dudley Kinsell and informed the court that Federal agents were demanding payment in full of the taxes, although, he said, an agreement had been made whereby these taxes were to have been paid in monthly installments. He also informed the court that the working capital of the company, which is a $5,000,000 concern, is at present $18,000.

Lanktree took over the company on Aug. 7 and, according to a recent agreement reached with the San Francisco Board of Trade by stockholders of the corporation, the concern was to have been returned to the president and one of the directors, under bond of $50,000, for operation. These two officials are now under indictment for alleged misuse of funds of the company. The government had a lien on the property when Lanktree took it over.

In his report to the court Lanktree declared that the company's output had been increased and the expense decreased since he took hold of it. He told of cutting payrolls and of raising factory production from 15 to 85 tires per day. He asked $1,500 for his work as receiver and $2,500 for his attorneys.

Highway Research Board to Hold Annual Meeting

WASHINGTON, Oct. 22—The third annual meeting of the Advisory Board on Highway Research of the National Research Council will be held in this city Nov. 8 to 9.

In addition to committee reports, Thomas H. MacDonald, chief of the United States Bureau of Public Roads, will speak on "Objectives of Highway Research." The report of the committee on highway finance, of which Dr. J. G. McKay of the Bureau of Roads, is chairman, will include a study of the effect of highway improvement on land values in four Wisconsin counties and describe research work on highway finance now under way in several States.

The report of George E. Hamlin of the Connecticut Highway Commission as chairman of the highway traffic committee will include a discussion of the value of traffic surveys in determining the allocation of construction and maintenance funds in the development of a State highway system, and a description of the organization of such surveys.

Claims Will Be Paid by Kentucky Wagon

Part to Be Met by Merger with National and Rest by Working Up Inventory

LOUISVILLE, KY., Oct. 22—Creditors of the Kentucky Wagon Manufacturing Co. will be paid in full at an early date, according to a report filed in Federal Court by James R. Duffin, attorney for the company, and sworn to by Robert V. Board, president.

The report states that 55 per cent of the debts of the wagon company have heretofore been paid, or will be paid by the proposed composition in securities of the National Motors Corp. that will soon begin operating the plant.

Forty-five per cent of the debts—all that remains—are to be paid by the wagon company, the report reads.

The entire amount of all these notes, as shown by the schedules, is $930,112. These notes are to be paid by working up the wagon inventory into finished products, and there is now on hand, as a result of the operations in working up this inventory, a total of $597,045, including cash and drafts equivalent to cash, notes and bills receivable, open accounts receivable, wagon inventory completed and ready for shipment.

Duffin filed an agreement of the majority of creditors in amount and number to accept the composition offer, in the court of Judge DuRelle, referee in bankruptcy.

Through the amended petition, creditors will receive 10 cents on the dollar of their claims at once, and 45 cents from the inventory of the company when it is turned out in manufactured goods. The remainder of the debts will be paid by notes of National Motors.

Crankless Engine Placed on Display in New York

NEW YORK, Oct. 23—A wabble plate engine or crankless engine is being exhibited here by the Crankless Engine Co., Inc., a Florida concern.

The engine has five cylinders of 3¼ in. bore by 4 in. stroke, which are arranged with their axes parallel to each other and at equal distances from the axis of the wabble plate shaft, which shaft passes through an open space between the cylinders.

Curves obtained in a test made at the Massachusetts Institute of Technology are being shown, according to which the engine developed a maximum horsepower of 15.3, at a speed of 1000 r.p.m. The friction horsepower at the same speed was 5.4.

GEORGE E. PEACOCK DIES

DETROIT, Oct. 23—George E. Peacock, factory manager of the plant of Durant Motors, Ltd., Leaside, Ont., died on Saturday. Mr. Peacock was well-known in the industry, having been previously identified with the Olds Motor Works at Oshawa, Canada. One of his greatest achievements was the fitting of the Durant Canadian plant for manufacture in less than two months. On Jan. 15, 1922, there was not a piece of machinery in the plant, and on March 1, 1922, the plant's first complete car was driven out.

SOUTH IN BEST SHAPE, RESERVE BANKER SAYS

ATLANTA, GA., Oct. 22—In an address at New Orleans at the dedication of the new Federal Reserve Bank there, Governor M. B. Wellborn of the Federal Reserve Bank of Atlanta declared the South to be probably in the most prosperous condition in its history and facing an indefinite period of good business.

Practically every line of business and industry in the district, the Governor stated, is enjoying excellent volume, with the prospect that business will hold to this level the rest of the year and well into 1924.

This is reflected, he said, in reports of Federal Reserve member banks in the Sixth District, which comprises the group of southeastern States.

It is doubtful, he stated, if general business conditions in the section have ever been on a more healthy and stable basis than they are at present.

Report Shows Slackened Operations 2 Years Ago

WASHINGTON, Oct. 22—Analysis of returns made by automotive manufacturers in the 1921 schedules of the census of manufactures, heretofore confidential, shows that the 385 establishments manufacturing motor vehicles only produced 43.1 per cent of their maximum capacity.

The value of the products in 1921 was $1,671,386,976, while the estimated possible maximum ouput would have reached a valuation of $3,875,762,348.

The 1974 establishments manufacturing "motor vehicle bodies and parts" had an actual production valued at $408,016,532 in 1921 with a possible maximum output of $954,000,249, indicating that the actual was 42.8 per cent of the possible maximum production.

In the classification of "motorcycles, bicycles and parts" forty-six establishments produced articles valued at $23,097,749, or 34.4 per cent of possible maximum output, which, it is estimated, would have reached $67,053,905.

The twenty-one establishments engaged in manufacturing "airplanes, seaplanes, airships and parts" had a production valuation of $6,641,988, which represented 26.5 per cent of the possible maximum output estimated at $25,036,840.

Ford Asks to Build Hydro-electric Plant

Plans Call for Erection of Huge Dam Across Menominee River in Wisconsin

MADISON, WIS., Oct. 22—Plans for one of the largest hydroelectric development projects ever undertaken are revealed by the application for a permit to build and operate made to the Railroad Commission of Wisconsin by the Ford Hydro-Electric Co. of which Edsel B. Ford is president.

The specifications call for the construction of a huge dam across the Menominee River at Florence, Wis., at the Michigan State line, and a generating system, with distribution to all parts of upper and lower Michigan. The principal consumer of the power, however, will be the Michigan Iron, Land & Lumber Co. of Iron Mountain, Mich., a Ford interest with large sawmills, planing mills and body stock factories.

The Ford company owns a number of sites on the Menominee River above and below the site to be first developed, and on other streams in extreme northern Wisconsin.

In cooperation with several other large water power owners in Wisconsin, the Ford interests were successful in fighting a proposed law at the recent biennial session of the Wisconsin legislature, which aimed to prevent any private concern from gaining control of water power sites for a period of six years, so the State might make a survey and acquire sites, as a matter of conservation of natural resources.

After the bill was defeated the Legislature adopted a resolution praising Henry Ford for his intention of developing a great water power in Wisconsin as a decided benefit to the State.

Sales Offices of Wills Moved to Detroit Branch

DETROIT, Oct. 24—Wills Sainte Claire, Inc., will locate its main sales offices, which have been located at the Marysville plant since the company began operations, at a direct factory branch opened in Detroit this week. E. C. Morse, sales manager of the company, will take up his headquarters here this week and will direct many of the distributive and retail activities of the branch in connection with his factory sales work.

The branch is located on Jefferson Avenue, and is one of the finest in the city. It is within easy distance of the heart of the business section in Detroit and will be convenient for visiting Wills dealers and distributors. This is the main reason for the location of the general sales offices in this city, as the Marysville factory was difficult to reach from Detroit and the factory wanted closer contact with its dealers.

N.A.C.C. Announces Standing Committees

Several Shifts Made, Some of Them Due to Retirement of J. Walter Drake

NEW YORK, Oct. 23—Several changes have been made in the standing committees of the National Automobile Chamber of Commerce, brought about by shifts in the industry and other causes.

The appointments for the coming year as announced today by President Charles Clifton show that some of these changes were caused by the retirement of J. Walter Drake of Hupmobile, who is now Assistant Secretary of the Department of Commerce at Washington. This brought about a new head for the Foreign Trade Committee, John N. Willys being selected to succeed Drake. C. D. Hastings, Hupmobile, succeeds Drake on the Show Committee. On the Taxation Committee David Ludlum, Autocar, replaces Drake.

Changes in Personnel

On the Advertising Committee R. H. Crooker of Federal Truck and Frederick Dickinson of Hupmobile are listed instead of L. B. Dudley of Federal and G. H. Phelps of Dodge Brothers. Windsor T. White of White succeeds A. J. Brosseau of Mack on the Membership Committee, while on the Motor Fuels Committee William Robert Wilson of Maxwell becomes chairman in place of John N. Willys. The latter, however, remains on the committee. Moie Cook of Service Truck has retired and his place has not been filled.

The Motor Truck Committee has been reduced in size from nine to seven members, R. H. Salmons of Selden, F. E. Smith of Republic and Ray E. Chamberlain of Packard retiring, and O. H. Browning of International Harvester being added. On the Patents Committee A. Chanter of Studebaker succeeds J. L. Pratt of General Motors.

F. A. Bonham of Durant Motors has been chosen as chairman of the Service Committee, and F. J. Wells, Pierce-Arrow, former chairman, remains on the committee. B. B. Bachman, Autocar, is on the Truck Standards Committee in place of A. Morehouse, Packard. A. G. Rumpf, Studebaker, has been added to the Insurance Committee.

Roster of Committees

The complete roster of the committees is as follows:

ADVERTISING—Edward S. Jordan, Jordan, chairman; A. B. Batterson, Buick; W. E. Betts, Studebaker; R. H. Crooker, Federal; Frederick Dickinson, Hupmobile; G. U. Radoye, Haynes; W. K. Towers, Paige-Detroit; John C. Long, secretary.

FOREIGN TRADE — John N. Willys, Willys-Overland, chairman; J. D. Mooney, General Motors; H. B. Phipps, Hudson; Jay P. Rathbun, White; H. M. Robins, Dodge; Howard S. Welch, Studebaker; George F. Bauer, secretary.

HAND BOOK—E. T. Strong, Buick, chairman; R. C. Rueschaw, Reo; George A. Kissel, Kissel.

HIGHWAYS—R. C. Chapin, Hudson, chairman; George M. Graham, Chandler; W. E. Metzger, Columbia; Edward S. Jordan, Jordan; A. J. Brosseau, Mack; Pyke Johnson, secretary.

INSURANCE—W. E. Metzger, Columbia, chairman; Stewart McDonald, Moon; Livingston L. Short, Buick; R. C. Rueschaw, Reo; E. E. Staub, Hudson; Milton Tibbetts, Packard; A. G. Rumpf, Studebaker; J. S. Marvin, secretary.

LEGISLATIVE — H. H. Rice, Cadillac, chairman; D. C. Fenner, Mack; J. I. Farley, Auburn; David S. Ludlum, Autocar; H. P. Doolittle, International Harvester; Harry Meixell, secretary.

MEMBERSHIP—Alvan Macauley, Packard, chairman; R. E. Olds, Reo; Windsor T. White, White.

MOTOR FUELS—William Robert Wilson, Maxwell, chairman; John N. Willys, Willys-Overland; S. E. Ackerman, Franklin; C. F. Kettering, Buick; C. W. Nash, Nash; S. A. Miles, secretary.

MOTOR TRUCK — Windsor T. White, White, chairman; O. H. Browning, International Harvester; D. C. Fenner, Mack; David S. Ludlum, Autocar; Robert O. Patten, Pierce-Arrow; M. L. Pulcher, Federal; E. A. Williams, Garford.

SHOW — H. M. Jewett, Paige-Detroit, chairman; F. C. Chandler, Chandler; Charles D. Hastings, Hupmobile; S. A. Miles, secretary.

PASSENGER CAR STANDARDS—N. E. Wahlberg, Nash, chairman; George B. Allen, Liberty; H. T. Thoms, Reo.

PATENTS—C. C. Hanch, H. C. S., chairman; A. J. Brosseau, Mack; H. M. Jewett, Paige-Detroit; James McAvly, Chevrolet; A. Chanter, Studebaker; R. A. Brannigan, department manager.

SERVICE—F. A. Bonham, Durant, chairman; F. J. Wells, Pierce-Arrow; A. B. Cumner, Autocar; L. C. Voyles, Marmon; W. M. Warner, Cadillac; H. R. Cobleigh, secretary.

TAXATION—C. C. Hanch, H. C. S., chairman; David Ludlum, Autocar; H. H. Rice, Cadillac; George M. Graham, Chandler; F. J. Haynes, Dodge; Pyke Johnson, secretary.

TRAFFIC — W. E. Metzger, Columbia, chairman; A. T. Waterfall, Dodge; F. C. Chandler, Chandler; William L. Day, General Motors Truck; George M. Dickson, National; James S. Marvin, department manager; Kenneth A. Moore, Detroit office of N. A. C. C.

TRUCK STANDARDS—D. C. Fenner, Mack, chairman; H. E. Derr, International Harvester; F. A. Whitten, General Motors Truck; E. M. Sternberg, Sterling; B. B. Bachman, Autocar.

STATE CONTROL LAW BASIS OF TEST CASE

DETROIT, Oct. 23—Application for an injunction to restrain the Michigan Utilities Commission from enforcing State laws controlling commercial motor carriers, made by the Liberty Highway Co., as a test case, was taken under advisement in the Federal Court here Monday, three judges hearing the application.

Counsel for applicant contended that the Federal law only should control common carriers doing interstate business.

Dealers Had 399,600 Used Cars October 1

Reports Received by N. A. D. A. Indicate That 400,000 Are Absorbed Monthly

ST. LOUIS, Oct. 23—Dealers' losses on used cars during the three months ended Sept. 30 dropped to $5,654,000 on 399,000 cars, according to figures compiled from reports of dealers to the National Automobile Dealers Association.

This reduction is 73½ per cent from the previous quarter, when losses reported amounted to $21,000,000 on 360,000 cars and a further saving on the first three months of the year when the losses amounted to $23,000,000 on 400,000 cars.

From the figures it is apparent that the used car demand is for about 400,000 cars per month. On Oct. 1 there were 399,600 used cars in dealers' hands, with an approximate value of $134,830,800, or $337.41 per car.

It is expected that these stocks will be increased during the next three months when the market for this grade of car is not so active, and when the increase in cars taken in trade will add to the stock on hand.

Since Jan. 1 dealers have handled 2,700,800 used cars at a loss of approximately $49,000,000 up to Oct. 1, which compares favorably with the figures of last year, which showed a loss of $105,000,000 for the twelve months. These losses represent only the difference between the prices allowed for cars and the amount for which they were sold, and do not take into consideration reconditioning and overhead.

Bethlehem Equips Trucks with Four-Wheel Brakes

ALLENTOWN, PA., Oct. 24—Announcement is made by the new Bethlehem Motor Corp. that Bethlehem trucks are to be equipped with four-wheel brakes.

Front brakes are actuated by a shaft attached to the axle center. Both the front axle and front brakes are the product of the U. S. Axle Co. The axle is a reverse Elliot type and is equipped with inclined pivots and wheel spindle, arranged to give approximate center point steering. Shoes are expanding type and are fully inclosed.

Front wheel brakes are now available on the Airline 1-ton model and will shortly be available on 2- and 3-ton models.

NEW ADDITION TO CHEVROLET

TOLEDO, Oct. 24—A contract has been awarded for the construction of a new $100,000 shop as an addition to the Toledo plant of the Chevrolet Motor Ohio Co., which manufactures transmissions for Chevrolet. The expansion will permit of enlargement of the working force here by several hundred.

Annual Display Made of Electric Trucks

Battery Makers Also Exhibit at Exposition Staged in Grand Central Palace

NEW YORK, Oct. 24—At the annual electrical show held in Grand Central Palace, electric vehicles of the commercial type were exhibited by the Autocar Co., the Commercial Truck Co., O. B. Electric Vehicles, Steinmetz Electric Motor Corp., the Walker Vehicle Co. and Walter Motor Tuck Co.

In addition, industrial trucks (or inter-plant trucks as they are called by some producers) were shown by the Baker R & L Co. and the Yale & Towne Manufacturing Co. Three makes of batteries for electric vehicles were represented: the Edison, Exide and Philadelphia.

Battery exhibitors also showed automobile and radio types.

Trucks Have Been Standardized

Electric trucks have been standardized to a large extent and changes in design are made only at long intervals. Consequently, there was little new to be found in this line at the show. Electric vehicle manufacturers, however, take advantage of progress being made in the automobile field and it was observed that several had recently adopted high pressure systems of chassis lubrication.

The newest make in the electric truck field is the Autocar electric, the salient features of which were described in AUTOMOTIVE INDUSTRIES of June 7, last. Since that description appeared the company has added a 3-ton model which follows the 1- and 2-ton models in general design. The 3-tonner has a wheelbase of 126 in. and the total loaded weight is in the neighborhood of 16,000 lb. The arrangement of the battery box, the location of the motor and the drive to the rear axle are the same as in the smaller models.

According to a sign displayed at the show, there are now 4334 electric trucks in service in the Metropolitan District, and it is claimed that twenty-five of these are more than 21 years old. The largest user of electric trucks in the country is the American Railway Express Co., which has 1407 of them, followed by the Ward Baking Co., with 967.

Battery Charging Exhibit

The two large electric companies, General Electric and Westinghouse, were on hand with exhibits of their products, the Westinghouse exhibit being devoted chiefly to battery charging apparatus. There were many exhibits of electrically driven tools, both wood-working and metal-working, and much space was devoted to lighting equipment and industrial applications of electricity.

A promotion booklet entitled "Putting Electricity to Work to Reduce Delivery Costs" has been issued by the Society for Electrical Development, Inc., in cooperation with the Electric Transportation Bureau of the National Electric Light Association. The booklet is addressed chiefly to central station operators, impressing upon them the importance of developing electric vehicle business as a means of increasing their load factor, and telling them how to do it.

Velie Motors Produces New Brougham at $1,945

MOLINE, ILL., Oct. 24—Velie Motors Corp. announces a new brougham model on the Velie 58 chassis and priced at $1,945. It has a full metal-covered body which is built quite low.

All four doors are full width, and the front and rear seats are as wide as in the standard sedan. The door windows operate by rotating lifts, and the rear quarter windows can also be dropped. The upholstery is taupe mohair.

Besides the standard equipment, there is a flower vase, vanity case, smoking set, aluminum body rails, mirror, windshield cleaner, trunk with two suitcases, hatbox and waterproof cover. A choice is offered in color: Velie blue or Pelican gray.

Making Brougham Body to Be Used on Dodge

INDIANAPOLIS, Oct. 23—A brougham body designed for application on Dodge Brothers chassis and intended to be sold through Dodge dealers is now being produced by the Millspaugh & Irish Corp.

This body is a two-door type, trimmed in blue cloth with nickel finish hardware. It is 46 in. wide, inside measurement, and the rear seat is designed to accommodate three persons. Front seats are individual bucket type with coil back as well as cushion springs.

5-Passenger Tourabout Part of Stutz Six Line

INDIANAPOLIS, Oct. 22—A new model of the sport variety is found in the Stutz six five-passenger tourabout just put into production.

The equipment is quite complete, including six disk wheels and six oversize cord tires and tubes, scuff plates, three-quarter length running boards and rear trunk. The upholstery is of Spanish leather and the floor of the tonneau is covered with horsehair carpet.

JOLITE ELECTS OFFICERS

MILWAUKEE, Oct. 22—John Last, inventor and patentee of the Jolite process of treating tool steel, has been elected president of the Jolite Co. and the Jolite Tool Co., two new Milwaukee corporations organized to market the metal as well as manufacture tools from it. George M. Wolff is vice-president; Cyrus L. Cole, secretary, and Dean R. Williams, treasurer.

Gardner Brings Out New Phaeton Model

Has Special Permanent Top and Can Be Converted Easily Into an Open Car

ST. LOUIS, Oct. 22—The Gardner Motor Co. has brought out a new model standard phaeton, with special permanent top incorporating many features of the enclosed panel body, yet readily convertible into an open phaeton for summer driving.

The top is of slat roof construction, the light part of the slats running lengthwise and supported by seven crosswise bows. The outside frame of the roof and the cross bows are laminated material.

The roof is covered with black rubberized double texture material and the rear side quarters and back stays are covered with three-ply buckram. The roof is lined beneath the bows with a tan colored material. An aluminum gutter, finished in black enamel, extends the full length of the side quarters and around the front.

Two sets of curtains are supplied as standard equipment, regular phaeton curtains for summer use and the winter enclosure which is both wind and waterproof. The glass is of generous size and ample ventilation is provided through the glass in all four doors which slide back and forth in felt lined panels.

The price of this model, with complete equipment, is $1.095.

Studebaker to Turn Out $1,475 Light Six Coupé

DETROIT, Oct. 24—Studebaker has added a new five-passenger coupé to its light six line. The rear seat extends clear across the body and seats three. The driver's seat and auxiliary seat are identical in size and cushioning. The auxiliary seat is of the improved bucket type and can be folded when not in use. The upholstery is of Chase mohair with top lining, trimming and floor carpets in harmony.

The lighting equipment includes distinctive headlights, coach lamps and rear corner reading lights operated from the instrument board. The doors are hung on concealed hinges. The equipment includes heater, windshield cleaner and glass visor in addition to regular equipment.

The price is $1,475.

WINTON TO CONTINUE BRANCH

SAN FRANCISCO, Oct. 22—The Winton branch organization in San Francisco is to be continued, according to decision of the officials of the company. Some time ago, J. Murray Page was sent here to make arrangements for the disposal of the branch, but this plan has been abandoned.

Parts Sales So Far Exceed All of 1922

M. A. M. A. Reports Business of $476,547,000 for First Three Quarters of Year

NEW YORK, Oct. 22—As indicating the prosperity and good business the parts makers have enjoyed this year, reports filed by members of the Motor and Accessory manufacturers show that in the first nine months of 1923 sales were greater by $35,213,000 than for the entire year of 1922.

At the three-quarter mile post the returns of $476,547,000 tell the industry that the parts business has increased 154 per cent over the corresponding period last year in which time sales totaled $310,251,720.

September's report reflects a normal slowing up by automobile producers if orders placed for parts are the usual barometer. September this year shows a falling off of 8.04 per cent from August, 1923. In September, 1922, the decline from the preceding month was 13.6 per cent and for the balance of that year sales declined at the rate of a couple of million a month.

This year has been remarkable for the pace maintained by the parts people, the poorest month, last January with $45,451,950, being better than the highest totals of 1922—$43,700,000 in both May and August. The slowest month of 1923 was January with $45,451,950.

A startling note is struck in September's report on past due notes, where there has been an increase of 50.39 per cent over August.

Still, no great alarm is felt here, it being believed to denote a slowing up of buying and a conservation of financial resources by car manufacturers rather than any lack of resources on the part of the equipment makers' customers.

SALES MADE BY M. A. M. A. MEMBERS IN SEPTEMBER REACHED TOTAL OF $46,222,650

NEW YORK, Oct. 22—Reports from members of the Motor and Accessory Manufacturing Association show that sales in September decreased 8.04 per cent from August. Total sales amounted to $46,222,650 as compared with $50,264,100 in August. Past due accounts showed an increase of 50.39 per cent.

The following table shows the sales by members of the association, the total past due accounts and notes held for all of 1922 and the first nine months of 1923:

1922	Total Sales	Per Cent Change	Total Past Due	Per Cent Change	Total Notes Outstanding	Per Cent Change
January ...	$17,320,000	20.61 Inc.	$4,450,000	5.45 Inc.	$3,146,000	7.02 Dec.
February ..	22,720,000	31.17 Inc.	4,070,000	8.57 Dec.	3,483,000	10.74 Inc.
March	28,670,000	26.14 Inc.	2,890,000	28.86 Dec.	2,657,000	23.69 Dec.
April	33,830,000	18.70 Inc.	3,000,000	2.00 Inc.	2,500,000	1.05 Dec.
May	43,700,000	28.06 Inc.	2,900,000	2.75 Dec.	2,450,000	6.05 Dec.
June	42,000,000	3.85 Dec.	2,840,000	1.25 Dec.	2,320,000	5.00 Dec.
July	41,001,670	2.42 Dec.	3,423,850	20.42 Inc.	2,217,670	4.49 Dec.
August	43,700,000	5.00 Inc.	3,705,000	8.21 Inc.	2,398,350	8.15 Inc.
September.	37,300,050	13.36 Dec.	4,220,400	13.91 Inc.	2,658,800	10.86 Inc.
October ...	39,753,800	3.90 Inc.	3,463,850	17.93 Dec.	2,603,100	2.09 Dec.
November..	36,616,850	5.51 Dec.	4,245,850	22.58 Inc.	2,442,700	6.15 Dec.
December..	34,711,630	5.20 Dec.	3,494,850	17.69 Dec.	1,905,650	21.98 Dec.
1923						
January ...	45,451,950	30.94 Inc.	2,469,950	29.33 Dec.	1,945,850	2.11 Inc.
February ..	48,518,700	6.75 Inc.	2,741,100	10.82 Inc.	1,981,950	1.86 Inc.
March	59,428,800	22.49 Inc.	2,129,350	22.32 Dec.	1,929,300	2.66 Dec.
April	61,647,050	4.00 Inc.	2,313,150	8.05 Inc.	1,839,350	5.00 Dec.
May	58,409,550	5.25 Dec.	1,982,750	14.28 Dec.	1,140,150	38.00 Dec.
June	58,067,500	.059 Dec.	2,191,150	10.55 Inc.	1,111,970	2.47 Inc.
July	48.536,700	16.4 Dec.	2,313,400	5.6 Inc.	1,424,450	28.1 Inc.
August	50,264,100	3.5 Inc.	2,382,370	7.00 Inc.	1,132,250	20.00 Dec.
September.	46 222,650	8.04 Dec.	3,583,000	50.39 Inc.	1,322,550	16.8 Inc.

Milk Shippers to Hear Reports on Truck Use

WASHINGTON, Oct. 24—One of the principal subjects to be taken up at the annual meeting of the National Federation of Milk Producers at Pittsburgh Nov. 8 will be the use of motor trucks.

Several members who have conducted extensive research into the problem of motor transport and the feasibility of cooperative fleets to haul milk products of various producers to nearby markets will submit their reports.

MARSH ANCILLARY RECEIVER

BROCKTON, Mass. Oct. 23—Appointment of an ancillary receiver for property in this city of the Marsh Motor Co. of Ohio has been asked for in the United States District Court at Boston by the Potter & Johnson Machine Co. of Rhode Island, a creditor. The bill states that a receiver has been appointed for the Marsh company by a Federal Court at Cleveland, and the defendant company is equitable owner of real estate at Brockton.

The receiver was appointed by the Cleveland court last June.

More Tire Companies Drop Consumer Lists

NEW YORK, Oct. 24 — Firestone, United States and Fisk, among the larger tire manufacturers, have eliminated their consumer list prices. It is expected that other large producers will follow suit within a few days.

Indications in rubber circles are that discard of list prices will become general throughout the industry, although the movement may take some time to spread to all of the 200-odd companies engaged in the business.

The feeling among the manufacturers is that withdrawing of list prices will discourage the widespread practice of dealers of bidding for patronage on the basis of discounts. It is expected that public attention will be turned away from price and directed toward the quality of tires and the merchandising and service facilities of dealers.

It is too early to forecast the reaction of dealers in the manufacturers' move in eliminating list prices. However, some reports already received from middle western cities at the offices of the National Tire Dealers Association indicate that the new policy is meeting with approval in that section.

A number of New York dealers have stated approval of the no-price-list idea, provided it is adopted and generally adhered to by most manufacturers.

Car Sales Value Put Over 3 Billion Mark

NEW YORK, Oct. 22—Addressing the Bankers' Forum, New York Chapter, American Institute of Banking, B. E. Hutchinson, vice-president and treasurer of the Maxwell Motors Corp., estimated the retail value of passenger car sales in the automobile industry this year at approximately $3,375,000,000, or about $144 per family.

Automobile manufacturers and dealers, he said, have about $2,000,000,000 capital invested, and estimating the national wealth at three hundred billion about 1.3 per cent of it is tied up in automobiles in use.

Hutchinson declared that the so-called saturation point does not exist, at least in the sense that there is any fixed number of automobiles this country can absorb at any one time, or can absorb during any one year. Continuing, he said:

Used Car Market Important

The question in the mind of the individual buyer generally is, "Shall I overhaul and paint, or buy a new car?" His answer is not infrequently determined by the price he can get for his used car on the trade-in. That in turn is determined in the large by the market for second-hand cars, which is largely dependent upon the condition of general prosperity or retrenchment.

The automobile industry will probably always be especially sensitive to general conditions or prosperity or depression and able management will take suitable precautions to discount these conditions in advance, but the fundamental financial structure of the industry is sound in the sense that it is based upon a service of the country that is socially and economically essential.

Men of the Industry and What They Are Doing

Swayne Directs Traffic Section

Alfred H. Swayne, vice-president of General Motors, in addition to his other duties has been appointed director of the traffic section of the advisory staff in charge of the Association of Traffic Representatives of the various operating divisions of the General Motors Corp.

Harrison Boyce on European Trip

Harrison Boyce, vice-president and general manager of the Moto-Meter Co., sailed recently for Europe. He will visit England and France and will be gone about a month.

Loomis Takes Fenn's Place

Edward F. Loomis of Springfield, Mass., has been appointed secretary of the Motor Truck Committee of the National Automobile Chamber of Commerce, to succeed F. W. Fenn, who resigned to enter the truck business at Rochester, N. Y. Loomis graduated from Amherst in 1917. Since that time he has seen newspaper service, first on the Springfield *Republican* and later as managing editor of the New London *Day*.

Resignation of M. B. Leahy

M. B. Leahy has resigned as general sales manager of Durant Motors, a position he has held since April, 1921. It is understood, however, that he is not leaving the organization, and as yet President Durant has not announced what the connection will be. Leahy's successor has not been named.

Prest-O-Lite Appoints Parrill

Frank L. Parrill, formerly advertising manager of the Cole Motor Car Co., has been appointed sales promotion manager of the Prest-O-Lite Co. of Indianapolis and will have charge of all advertising and sales promotion for the company, including both the storage battery and small gas tank divisions.

Fesler Returns Home

D. F. Fesler, vice-president and general manager of the Bassick Manufacturing Co., maker of Alemite, who has returned from a two months' visit to Europe, reports that Tecalemit, the French Alemite, with a factory in Paris, has started the erection of two new plants, one in England and the other in Italy. At the Paris Salon he said, 106 of the 117 makes of cars displayed were equipped with Tecalemit.

Huntoon with Tri-City Malleable

George E. Huntoon, recently resigned from the Moline Plow Co. organization, has been elected treasurer of the Tri-City Malleable Casting Co., East Moline, Ill. He had been purchasing agent for the Plow company many years but has become interested in the new casting concern. He will serve as purchasing agent in the new company.

Harry T. Clinton in Retail Field

Harry T. Clinton, formerly assistant general manager and sales manager of the Fiat Co., has entered the retail field in his home town, Poughkeepsie, N. Y., where he has formed the H. T. Clinton Motor Sales Co. The company will distribute the Marmon and Peerless in Dutchess, Ulster and Orange counties.

Wood Hydraulic Promotes Dewey

Frank H. Dewey, for two years sales engineer of the Wood Hydraulic Hoist & Body Co., has been promoted to the position of assistant general manager directing sales promotion, advertising and cooperation with manufacturers and dealers. Dewey came to the company from the Horizontal Hydraulic Hoist Co. of Milwaukee, when it was absorbed by the Wood company.

Moline Honors Burns

L. N. Burns, president of the O. E. Szekely Co. of Moline, Ill., an automotive engineering concern, has been elected president of the Moline Chamber of Commerce.

Sachsenmaier Names Frenier

L. E. Frenier, formerly connected with the Frenier Supply Co., has been made sales manager of the George Sachsenmaier Co. of Philadelphia. The Sachsenmaier company is building a new factory at Holmesburg, Pa., for the manufacture of Dunning air compressors and expects to be in the plant by Nov. 1.

Frank T. Chase Resigns

Frank T. Chase, for years sales manager of the Frank Mossberg Co. of Attleboro, Mass., maker of Mossberg wrenches, has tendered his resignation, effective Jan. 1. Chase's future plans have not been announced.

Mathewson in Car Financing

Park Mathewson, director of the Budget Bureau of New York, has been appointed vice-president in charge of the automobile credit financing division of the Adap-Table System of the Bankers Development Corp. of New York.

Probst in Charge at Milwaukee

W. E. Probst, branch manager of the Miller Rubber Co. at Milwaukee, has been transferred and placed in charge of the company's Minneapolis branch, instead of being located at Akron as stated in AUTOMOTIVE INDUSTRIES.

Citroen Inaugurates Flat Rate in France

Observed Working of Systems During His Recent Visit to American Plants

PARIS, Oct. 13 (*by mail*)—Next week Citroen will inaugurate the first flat rate system to be applied in France, and will make it compulsory among his 400 dealers scattered throughout the country. The plan originated among a few of the more enterprising French dealers who specialized in Citroen cars and had worked out a limited flat rate scheme for repairs and service.

Citroen welcomed the suggestion, and after observing the application of flat rate systems during his recent visit to America decided to apply a factory flat rate scheme throughout the whole of France.

Two catalogs, dealing respectively with the two models produced by Citroen, have been printed and are on sale at a nominal price at all dealers. These books cover all kinds of repairs and replacements to the various parts of the car, and are based on prices pertaining in Paris with a modern shop equipment for handling Citroen cars.

An organization has been created for supplying dealers, at practically cost price, with the necessary tools and equipment for economical work on these cars. In addition, all dealers are encouraged to keep in stock an engine, a gear-box and a rear axle for immediate replacement of these units. The factory at Paris undertakes to supply to any dealer, at a cost of 900 francs, a used engine which has been completely overhauled and which is guaranteed for six months.

Meyers Succeeds Warmington

A. L. Warmington has resigned as controller of the Oakland, Cal., Durant plant in order to devote virtually all his time to the activities of the Durant-Steves Motors, Inc., and the Durant Corp. of that city. He is succeeded by W. J. Meyers, who has been his assistant for seven years. Warmington will remain as treasurer and as a member of the board of directors of the Durant corporation, devoting the greater part of his time to the financial end of both organizations.

Frick Joins Duratex

E. M. Frick has joined the Duratex Co. of Newark, N. J., in the capacity of assistant sales and advertising manager, a position he formerly occupied with the O'Bannon Co.

Saturation Estimate All Wrong, Says Bank

Sales Continue to Increase, It Declares, Because Car Has Become Necessity

MILWAUKEE, Oct. 22—"Production in automotive parts and equipment is well maintained, reflecting the activity in the manufacture of new cars," says the monthly summary of local business conditions compiled by the largest Milwaukee bank.

A slight decline in the number employed occurred during the past month, but it was negligible in comparison with a flat decrease of 2.07 per cent in the payrolls of forty-eight representative concerns having more than 500 employees, used as the basis of compilation.

The economist of the bank expresses himself in this report as follows concerning the automotive industries:

Cars Go to All Classes

Automobile production and sales have broken all records this year. The number of cars and trucks manufactured steadily increased until June. During June and July there was an unexpected seasonal decline followed by a slight recovery in August. During the first eight months of the year, as many cars and trucks were turned out as during the whole of 1922.

All calculations as to the so-called saturation point in the buying of motor vehicles have turned out to be wrong. The sales continue to increase because the automobile has to a large extent, become a social, if not in all cases an economic necessity and because the automotive industries have been reaching down to lower and lower income groups of the population in order to maintain large-scale production.

In the automotive industries, the history of the horse vehicle and bicycle industries bids fair to be duplicated in that competition furnishes a strong compulsion to bring down the product down within the means of larger and larger classes of people.

The contention that the rapidly increased sales of automobiles cuts down savings and causes retrenchment in expenditures for the more ordinary articles of consumption such as clothes, house furnishings, etc., lacks definite proof. In the face of a greatly enlarged distribution of automobiles there has been an increase in savings, an increase in home building and owning, and judging by figures of textile, shoe, house furnishings and hardware production, at least a normal increase in these lines of consumption.

Sizer to Resume Making of Commercial Forgings

BUFFALO, Oct. 24—Creditors of the Sizer Steel Corporation have provided additional funds which will permit the receivers to resume the manufacture of commercial forgings, which had been temporarily discontinued.

Manufacturing at the local plant will be under the direction of George F. Scherer. V. R. Schupp will continue in charge of forging sales, assisted by E. A. Mansfield.

The Hammond plant at Syracuse will continue to manufacture carbon, alloy and steel rolled bars and forgings made from electric furnace steel, trimmer steels and the spiral stems. This plant is managed by L. G. Pritz, who was connected with the Timken Roller Bearing Co. prior to his joining the Sizer forces fifteen months ago.

The sales of this plant will continue in the hands of Rowland S. Le Barre in Cleveland and the West, C. R. Poole in the Buffalo territory and C. A. Swan in the East.

Reports of First Week Promise Good October

(*Continued from page* 856)

commercial car bodies with an equal number of truck chassis. This order will go by way of New Orleans, while other shipments of both cars and trucks already have sailed from Seattle.

Truck business is improved, a greater demand being apparent not only for the new but for the used vehicle. General industrial conditions are becoming more stabilized and this is being reflected both in the even demand for cars and in the increasing call for commercial vehicles. Parts makers are moving along on an even keel, with some plants working at top speed. The many new models that have appeared on the market necessitated a temporary slowing-up in some plants which is being rapidly overcome as the new models appear and orders are placed incident to their quantity production.

Tax Must Be Paid on Cars Sold to Foreigners Here

WASHINGTON, Oct. 24—Efforts have been made by M. H. Hoepli, acting chief of the automotive division, Department of Commerce, to obtain a revision of the Treasury Department ruling relative to application of sales tax on automobiles sold here to foreigners.

Commissioner Blair of the Bureau of Internal Revenue, has advised the division that collectors of internal revenue are "without authority to exempt manufacturers from taxes on sales of automobiles to foreigners residing in this country who use their machines in this country and subsequently take them abroad."

Several manufacturers stated that sales to visiting foreigners would be helped if the taxes were waived on these cars destined for export after serving as tourist vehicles for the owners while in this country.

Motorists' Annual Meeting

WASHINGTON, Oct. 22—The first annual meeting of the National Motorists Association will be held in this city Nov. 16 to 17.

Sales in California Went Up 17 Per Cent

Southern Half of State Maintained Its Leadership During September

OAKLAND, CAL., Oct. 20—Prosperous conditions still continue in the automotive merchandising field in California, judging from the figures on September sales collected by "Motor Registration News," a statistical paper issued here. The total registration of automotive vehicles in this State for September, 1923, was 18,321, an increase of 17 per cent over the registrations of the same month in 1922, when 15,746 sales were recorded.

The southern half of the State maintained its leadership in sales, with a total of 11,081 cars and trucks, an increase of 26 per cent over September, 1922. The 47 northern counties bought 7300 cars and trucks, an increase of only 5 per cent over the same month last year.

Six of the leading California counties showed that their dealers had done an increased business; eight showed losses in sales and one county sold exactly the same number of cars as in the same month one year ago.

The largest gain made by any single division was by Los Angeles county, which had 8906 registrations, 40 per cent more than the business of September, 1922. San Francisco county showed the next largest gain, 24 per cent. San Diego county suffered the greatest decrease, selling 45 per cent less cars in September this year than in the same month in 1922.

Passenger car sales gained 19 per cent throughout the State, while motor truck sales fell off 1 per cent, compared with September, 1922. Dealers expect an improvement in October sales, when the residents in the agricultural districts will have been paid in full for their 1923 crops. This also probably will speed up truck sales to some extent, though no marked improvement in this line is expected before January, 1924.

G. M. C. Wins Suit Brought by Sheridan Distributor

WILMINGTON, DEL., Oct. 24—The United States District Court has rendered a judgment in favor of the General Motors Corp., defendant in a suit brought by Charles Chalmers, who claimed $50,000 damages for sums alleged to have been expended in the formation of a sales company in Philadelphia to handle Sheridan cars.

Chalmers claimed that the new car was not put into production on a large scale and, in fact, was discontinued. The Sheridan was the latest addition to the General Motors group prior to the retirement of W. C. Durant, the plant being located in Muncie, Ind.

Trade Balance Shows Prosperity in Peru

Imports and Exports Increase and Bank Clearings Are Shown to Be on Gain

LIMA, PERU, Oct. 1 (*by mail*)—The total imports and exports for the first six months of the present fiscal year have passed those for the corresponding period of the year previous and are as follows:

First six months, 1923	Lp. 15,230,170
First six months, 1922	12,717,941
Increase	2,512,229

The trade balance, however, in favor of Peru during the first six months of this year was Lp 2,302,852, in comparison with a favorable balance of Lp 3, 156,163 for the first semester of 1922.

This falling off may be accounted for partly by the fact that the old tariff, which expired on July 1 of this year, generally had lower duties than the new tariff that went into force at that date, and so importations were doubtless rushed. In addition, in the importations this year are included receipts by parcels post that amounted to Lp 422,544, an item not included in last year's statistics.

Trade Balance Above 1922

Total imports and exports for July, 1923, the first month of the second semester, were Lp 3,013,117, with a trade balance in favor of Peru of Lp 965,621, representing an increase over July of last year, when the total exports and imports were Lp 2,275,732 and the favorable trade balance of Lp 921,552.

The indications are that the total exports and imports of Peru for 1923 will surpass those for 1922 and be equal or exceed those for 1921, which amounted to Lp 33,329,672.

In 1913, the last year before the war, the total exports and imports of Peru were Lp 15,226,557. Today Peru in six months is doing more business than in a whole year a decade ago. There has not been a year since the war in Europe when the total trade movement was not double, treble and almost quadruple what it was previously.

Exports Doubled in Six Weeks

Imports of automobiles and trucks in Peru during the first six months of 1923 were almost twice as large as during the entire year of 1921 or 1922, and the remainder of 1923 promises to be even greater, owing to more favorable tariff duties and generally improving business conditions.

The growing prosperity of Peru as indicated by the total imports and exports is confirmed by the increasing returns or clearings of the Bank of Reserve of Peru. The bank was established only in May of last year, so that total figures are not available for a comparison with the first six months of this year, but the figures for July and August of this year, compared with those for the same months of last year show an upward trend:

	Total Clearings	Daily Average
July		
1922	Lp 3,684,894	Lp 167,495
1923	4,620,766	200,902
August		
1922	4,043,864	161,754
1923	4,419,329	184,138

August is always below July, as it immediately follows the national holidays, before which date a larger amount of business is always done.

An additional feature that makes the market for automobiles and trucks more favorable is a slowly developing movement in favor of road building. In several of the provinces of Peru where the future sale of trucks and automobiles lies highways are being constructed by means of a road tax that is paid either in labor or its equivalent in money. Although the work is not being pushed as rapidly as desirable, still the little that is being done is not suffering diminution, but, on the contrary, is slowly increasing.

Low Priced American Car Brings $3,500 in Russia

WASHINGTON, Oct. 24.—Translations of Russian newspapers and circulars by the Eastern European Division of the Department of Commerce show that regardless of the existing restrictions on the importation of passenger automobiles into Russia, placed by the Soviet Government in its decree of May 22, 1923 as a means of protecting the domestic automotive industry, and the limited absorptive power of the Russian market, importation and selling of passenger cars by private parties and organizations is going on freely and at enormously high prices.

The Centrosoyous (Central Co-operative Union) is selling low-priced American cars, the maximum cost price of which, c.i.f. Moscow, is 200-250 chervonetz (1 chervonetz is 10 gold rubles and 1 ruble, 51.46 cents) equivalent to $1,000 to $1,250 at 700-800 chervonetz, or about $3.500-$4,000, and Horch (German) cars, which cost to import about $2,900, as high as $6,500 to $7,500. Citroen (French) cars which cost c.i.f., Moscow about $1,250 are selling there around $2,650, while the "Russgertorg" (Russo-German Trading Co.) is charging for the same cars as high as $11,000-$13,000.

Italian Car Price Rise Due to Aluminum Cost

MILAN, ITALY, Oct. 12 (*by mail*)—It is reported here that the general increase of about 5 per cent in the price of motor cars during the summer was due largely to the high aluminum quotations.

The demand for medium size and small cars continues to grow.

One manufacturer has endeavored to cancel contracts for a total amount of 5,000,000 lire, because he accepted many orders in excess of producing capacity.

Date Definitely Set for Argentine Show

Will Be Held from Nov. 9 to 18 —Locally Built Bodies Will Feature It

BUENOS AIRES, ARGENTINA, Oct. 1 (*by mail*)—At a recent meeting of the Argentine Automobile Club the date of the sixth annual automobile show was definitely fixed for Nov. 9 to Nov. 18. As in former years the Pabellon de las Rosas will house the show, which will include the following divisions:

Passenger cars, Argentine built automobile bodies, accesories for automobiles, trucks and tractors, airplanes and motorboats, tires and tubes, motorcycles and bicycles, spare parts, ignition systems, oils and greases, aviation and marine engines, motor-trucks and tractors, tools and equipment for repair shops. Insurance companies will also have booths.

The drawing for stands will take place at an early date and the drawing will give the right to one stand in each section for each exhibitor. If available space is left after the first drawing it will be distributed by a subsequent drawing. The payment for space must be made within five days of the notification of the allotment.

Exhibitors Handle Decorations

While the club will give every facility to exhibitors in the way of organization and arrangement of exhibits, the matter of decorations must be undertaken by each exhibitor who also is responsible for losses which exhibits may suffer from fire and accident. All inflammable material is prohibited entrance.

Gasoline must be completely drained from the tanks at the moment the cars enter the exhibition hall. Under no consideration will engines be permitted to run inside the building.

A committee made up of Messrs. Silveyra, Abal, Delingere, Heske and Castroman will supervise the decoration of stands in order to secure uniformity, although the cost of decoration will be borne by exhibitors. The club has solicited and secured from railway companies a considerable reduction in round-trip tickets for visitors to the show.

More Enthusiasm Shown

In local automobile circles there is noticeable much more enthusiasm than was observable previous to other shows, due to the fact that a number of new features are to be introduced. The club hopes to make the show this year a real exponent of the progress of motor transportation in Argentina, laying special stress upon the features of racing which has been somewhat neglected of late.

One of the especially interesting features of the show will be the exhibits of custom-built bodies made in the country, an industry which has made great strides during the past year.

Claimed That Decree Limits Associations

Department of Justice Would Enjoin Collection of Certain Information

WASHINGTON, Oct. 22—Inquiry into the proposed consent decree against the Tile Manufacturers Credit Association has convinced Nathan B. Williams, associate counsel of the National Association of Manufacturers, that modification is necessary to protect trade association activities in other industries.

The Department of Justice proposes to enjoin the tile manufacturers' association from collection of certain types of statistical and other information, a move which is regarded as detrimental to industry in that it may prove an entering wedge for legal action against other trade associations.

Statistic Feature New

The decree would provide, however, that the Tile Manufacturers Credit Association and others named as defendants might receive and compile for transmission to any Government agency such information and statistics as the agency might request as to production, stocks on hand and prices. They would be restrained from distributing these data among their members. The permissive features of the decree follow the general lines of the consent decree entered in the case of the Gypsum Industries Association, which made no mention of the subject of statistics.

Because of its possible effects upon the activities of trade associations generally, Williams held two conferences this week with A. T. Seymour, assistant to the Attorney General, in which he urged that in the public interest the draft of the decree be modified by the elimination of all reference to Government departments.

Laws Rule Data Collection

Contention was also made that the collection of information by Government departments is properly controlled by statute. It was further urged that in the description of permissible activities of trade associations cost accounting be included, and that the decree carry the following paragraph relating to the subject of statistics:

To periodically or otherwise collect and make currently and otherwise available to those interested the facts relating to capital employed, power used, wages and or taxes paid, fuel consumed, machinery employed, and like pertinent trade information, production, sales, shipments, and stocks on hand of tiles and the prices obtained therefor, all of such being a record of accomplished facts.

In further recognition of the public interest to be protected, Williams suggested that, in addition to the availability of such statistics to those interested, a prohibition might properly be contained in the decree against the misuse of otherwise legitimate activities and information in furtherance of any agreement or conspiracy to fix prices, limit production, restrict sales, divide territory, or in any manner restraining lawful competition in commerce.

Williams insisted that in the opinion of the National Association of Manufacturers such a course would be in accord with legitimate practice.

In his conference with Seymour, Williams made it clear that American industry depended upon accurate business information.

He said there would be "serious consequences to the business fabric if the proposed decree should be entered in its present form. In our opinion, such a decree would, in effect, serve notice upon all trade associations that the Department of Justice regards the collection of statistical and other trade information, because occasionally misused, within the condemnation of existing law, and to be prohibited in so far as the Department of Justice was able to accomplish that end.

"It is quite true that such a decree would legally bind only those who are parties to it, but in the absence of a declared rule of law on the subject, such a decree must, in our judgment, be taken as expressing the honest conclusions of the Attorney General."

Final September Figures Place Output at 327,365

WASHINGTON, Oct. 22—There is not much variance between the Department of Commerce and the National Automobile Chamber of Commerce as regards automobile production in September, the former giving as its estimate 327,365, of which 298,910 were passenger cars and 28,455 trucks, while the latter, basing its figures on shipping returns and making its announcement three weeks ahead of the Government, named 328,748.

The Government finds that the total for the nine months is 3,029,982, as compared with 1,880,051 in the 1922 period.

The following tables show nine months' production and comparisons with 1922 and 1921:

PASSENGER CARS	1923	1922	1921
January	223,819	81,693	43,086
February	254,771	109,171	68.088
March	319,768	152,959	130,263
April	344,639	197,222	176,439
May	350,409	232,457	177,438
June	337,359	263,053	150,263
July	297,330	225,085	165,615
August	314,372	249,490	167,755
September	298,910	187,693	144,670
Total	2,741,337	1,698,823	1,223,617

TRUCKS			
January	19.646	9,517	4,831
February	22,067	13,291	7,830
March	35,037	19,920	13,328
April	37,862	22,488	18,070
May	43.462	23,948	18,070
June	40.973	26,171	14,328
July	30.494	21.957	11,132
August	30,619	24,601	13,391
September	28,455	19,335	33,975
Total	288,605	181,228	114,955

States' Law Officers Take Gasoline Action

Attorneys-General Draft Resolutions Asking for Conference With Daugherty

CHICAGO, Oct. 22—Attorneys-general from twenty-four States in conference here last week adopted resolutions calling for a conference with Attorney-General Daugherty on conditions in the petroleum industry, which they described as "chaotic, which threaten injury to the public and may disclose violations of the law."

The resolutions also call for further investigation of the industry and the enactment of regulating legislation by Congress and the various States. The resolutions recommend that proceedings be instituted to "terminate all combinations, agreements, unfair trade and other unlawful practices, suppression of competition or discrimination and undue advancement of the price of petroleum and petroleum products."

A committee named to confer with the United States Attorney General is composed of the following attorneys-general: Spillman of Nebraska, Napier of Georgia, Ekern of Wisconsin, Benton of Massachusetts, Coco of Louisiana, Rhodes of Kansas, Hilton of Minnesota, Cluff of Utah and Short of Oklahoma.

Investigation in New York

ALBANY, Oct. 22—Governor Smith, in response to the appeal by Acting Mayor Hulbert of New York City, has ordered an investigation of the prices charged for gasoline in the metropolis.

Henry Ford Tells Sperry $1,000 Plane Is Possible

NEW YORK, Oct. 22—Lawrence B. Sperry, president of the Lawrence Sperry Aircraft Corp., manufacturer of the flivver plane, is back from a business trip through the air which covered 2000 miles in the West. The trip was made at an expense of .0123 cent a mile, the gasoline consumption being eighty-two gallons, Sperry claims.

While in Detroit and on the invitation of Henry Ford, Sperry visited Dearborn and showed Ford his plane. The latter, Sperry says, was greatly interested in the Wright three-cylinder engine with which the Messenger is equipped and talked quantity production. Figuring that the engine could be built for $50 in large quantities, Ford is said to have predicted that the little plane could be put on the market under $1,000.

Going over the construction of the engine, Sperry reports that Ford believed sand-blasting the cooling fins instead of machining them, would greatly facilitate quantity building and also reduce the cost. The rocker arms, he thought, could be eliminated and the L-type head substituted, cutting costs.

A. A. A. Negotiating with General Butler

Plan Is to Make Him General Manager, Which Is a Newly Created Position

WASHINGTON, Oct. 24—Planning to extend the activities of the organization and make it even more powerful than it is, executive officers of the American Automobile Association are negotiating with Brig. Gen. Smedley D. Butler of the United States Marine Corps with the idea of appointing him general manager, a newly created position.

President Thomas P. Henry is conferring with General Butler, but as yet no announcement has been made.

The A. A. A. executive board met here today to discuss this new phase of association work and outlined a legislative program. They discussed the uniformity of traffic regulations and special reports on this subject will be made at the meeting in November. The suggestion was made that a standard should be set for intrastate traffic of motor vehicles which would be generally acceptable. The details have been given over to a select committee.

No recommendations were made relative to the board's legislative stand on highway finance and gasoline taxes, although considerable time was given to this subject in a report by Roy F. Britten of St. Louis, chairman of the legislative committee.

Members of the executive committee were disturbed by erroneous reports sent out to daily newspapers to the effect that General Butler would be named as "arbiter of the auto world." The press accounts stated that it was a committee of automobile manufacturers that were seeking the officer's services. The story gained such prominence that the Washington office of the N. A. C. C. issued a denial, signed by President Clifton and Vice-President Chapin.

Improved Foreign Field Expected for Tractors

WASHINGTON, Oct. 24.—Indications are that foreign sales of American tractors will show marked improvement this fall. While the domestic business is at a low ebb owing to the agricultural depression, the markets in Australia, France, Belgium and Turkey are better than expected.

Reports received by the Department of Commerce show that Australia offers the best market for American tractors. Sales are improving in Turkey as political conditions become more stabilized and the people are buying the smaller types for farming purposes.

It is expected that improvement in the domestic agricultural situation will be reflected in the sales of tractors in the United States through contemplated relief to the American farmer.

It is pointed out that the wheat farmer has to submit to the law of supply and demand. His production has exceeded demand and the deflation in prices has been extremely severe and has brought unfortunate consequence upon him. The distribution system of his products under such a situation reacts in the most unfavorable way possible.

President Coolidge and the Cabinet have held a series of conferences with representative farmers and hope to devise a program which will bring about a satisfactory adjustment.

FINANCIAL NOTES

Lee Rubber & Tire Co. voted to suspend payment of dividends after having maintained them uninterruptedly since 1920. In explanation President Watson says: "It is the aim of the management of the Lee company to keep it in a strong financial position and, considering the present condition of the tire industry, it seems that the interest of the stockholders is best served by conserving cash at this time."

Goodyear Tire & Rubber Co. directors have voted to anticipate at once the retirement of $5,000,000 prior preference stock. This stock will be retired under contract of purchase by the company on or before Feb. 1, 1924. This retirement reduces the outstanding amount of prior preference stock to $15,000,000. When the reorganization took place in 1921 the company had outstanding $30,342,000 of prior preference stock.

Stewart-Warner Speedometer Corp. announces net earnings of $1,608,648 after taxes for the quarter ended Sept. 30. This is equivalent to $3.39 a share earned on the outstanding 474,976 shares of no par capital stock compared with $1,657,554, or $3.49 a share on the corresponding quarter in 1922. For nine months ended Sept. 30 net earnings were $5,547,994, against $3,514,078 in the same period in 1922.

White Motor Co. has declared its thirty-second consecutive regular quarterly dividend of $1 per share on its 8 per cent stock, payable Dec. 31 to stockholders of record Dec. 20.

Earnings of Overland Above Million a Month

TOLEDO, Oct. 23—Business of the Willys-Overland plant here for this month will be the largest of any October in the history of the company, President John N. Willys declared today. He said the company would market 18,000 cars during the month. Factory forces have been augmented recently, and business for the rest of the year looks good.

"The dealers on the Pacific Coast are making great strides this fall," said Willys, who recently returned from a Western trip. "California dealers will take more cars than ever before in October. At Dallas alone we have calls for 1000 cars if we can deliver them."

While a financial statement for the third quarter has not been made public yet, it is estimated that it will show earnings greater than in the first part of the year. Earnings were running more than a million a month at the mid-year.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

The irregularity which has been observed in business trends during recent months was clearly in evidence last week. Commodities in general appear to have moved in somewhat increased volume at slightly lower prices.

Prices of wheat and corn showed a distinct downward reaction, while cotton advanced slightly.

The value of building contracts awarded in twenty-seven northeastern States in September was $253,525,000, according to figures compiled by the F. W. Dodge Corp. This compares with a total value of $253,105,800 for August. The value of contemplated projects reported for September was $340,449,300, as against $449,245,800 for August.

Preliminary figures from the Department of Commerce show total exports for September amounting to $381,000,000 and imports of $255,000,000. The export total is the largest monthly figure, and the import total the smallest of the year to date. The export balance of $126,000,000 leaves a net excess of exports for the first nine months of 1923 amounting to $36,000,000.

Professor Irving Fisher's index of wholesale commodity prices stood at 156 last week, comparing with 157 for the two preceding weeks. Bradstreet's food index receded from $3.31 to $3.28, while Dun's list of wholesale prices showed thirty-seven declines out of sixty-two price changes. The wholesale price index of the Bureau of Labor Statistics for September stood at 154, against 150 in August and 153 in September, 1922.

Reserve Discounts Declined

Discounts by the Federal Reserve banks declined $14,500,000 during the week ended Oct. 17. Bills secured by Government obligations decreased $20,100,000, while "other bills discounted" increased $5,600,000.

Loans of reporting member banks during the week ended Oct. 10 declined $28,000,000, loans secured by stocks and bonds falling off $73,000,000 and "all other" loans increasing $46,000,000. Reserve balances with Federal Reserve banks declined $23,000,000, while cash in vaults increased $18,000,000. Net demand deposits gained $15,000,000, and Government deposits declined $27,000,000. Accommodation at Federal Reserve banks declined $9,000,000.

Both call and time loan rates were easier last week, call money ranging from 4 to 4¾ per cent and time loans from 5 to 5½.

FITZGERALD BUYS LAND

TORRINGTON, CONN., Oct. 24—The Fitzgerald Manufacturing Co. of Torrington, Conn., maker of gaskets, looking ahead to future development and expansion, has purchased a large strip of land, 1500 x 500, back of its present factory site. It is expected to use the land within the next year.

Tire Dealers Urging End of Spring Dating

Trade in New York Recommends Plan to Be Discussed at National Convention

NEW YORK, Oct. 22—The New York Tire Dealers Association has recommended that the National Tire Dealers Association, in its convention here in mid-November, urged upon manufacturers the elimination of the spring dating practice. It is suggested that all special datings be done away with and that dealers be sold on an average credit of forty-five days.

The proposal of the New York association is that bills for tires shipped between the 1st and 15th of the month be due the 10th prox., and that tires shipped between the 15th and the last of the month be dated the 1st of the following month and due the 10th of the month after that.

The New York dealers have unanimously urged that this policy be recommended by the national association. Local tire dealer associations in Chicago and Oklahoma City and a number of other communities, responding to a questionnaire on the subject, also have favored the proposed new credit plan, and it is certain to come up for discussion at the national meeting.

Another recommendation of the New York dealers is that tire manufacturers carry accounts only with distributors or dealers whose business is principally in tires. It is their contention that automobile dealers, garagemen and others carrying tires as a side line should not be able to buy at the same price as exclusive tire distributors and dealers.

Ash and Maple Demand in South Keeps Steady

ATLANTA, GA., Oct. 22—Lumber manufacturers of the Atlanta territory advise that there has been a continued steady demand the last two months from the automobile body industry of the North and East for thicker dimensions of white ash and maple, with the result that the mills of the South are producing at capacity with a ready market for all ash they can manufacture.

The present year has proved by far the largest year in the history of the lumber industry in the South in the sale of ash to the automobile body trades. All thicker dimensions of ash have advanced in price the past month approximately 5 to 6 per cent, with the price tendency showing a strong upward basis.

OVERLAND AT PHILADELPHIA

PHILADELPHIA Oct. 24—The Willys-Overland Atlantic Co. has been organized to have charge of the new assembly plant recently acquired here. George D. McCutcheon is president and general manager of the new company.

The plant is scheduled to begin operations with the new year and will have a capacity of 200 cars a day. It will be the assembling base for Eastern districts.

INDUSTRIAL NOTES

Beaver Truck Co., Ltd., Hamilton, Ont., is reported to have purchased a five acre site in Brampton, Ont., for the erection of two factory buildings at a cost of approximately $150,000. The buildings will be of steel, brick and concrete and will be 100 by 350 feet and 120 by 70 feet. The company, it is said, will employ 125 men when operations start.

Wayne Tank & Pump Co., Fort Wayne, Ind., has leased a building in Toronto, Ont., as a branch factory. Machinery for manufacturing purposes is being installed. The company heretofore has maintained a selling office in Toronto. Its Canadian organization will be known as the Wayne Tank & Pump Co. of Canada, Ltd.

Thurner Heat Treating Co., Milwaukee, which recently incorporated its business under Wisconsin laws, has started work on the erection of a plant on a new site where future development and growth may be accommodated. It will be constructed in units, the first to be 48 x 50 ft.

Chicago Pneumatic Tool Co. has taken over the exclusive sale of all the products of the Crescent Pump Co. of Detroit.

Canadian-Made Exemption Held Unfair to Britain

MONTREAL, Oct. 23.—A cable to the Montreal *Star* from London, England, says:

"Sir John Thorneycroft, a leading engineer and builder of commercial vehicles, writing in favor of tariff protection for British manufacturers, makes the complaint that American vehicles enter this country as British-made on the strength of having been merely assembled in Canada.

"To obtain Empire preference it is only necessary to have them 25 per cent Canadian-made. This is very unsatisfactory to manufacturers in Great Britain who desire an amendment of regulations."

Gasoline Tax Will Yield California $28,000,000

SACRAMENTO, CAL., Oct. 24—The new gasoline tax of 2 cents a gallon, put on by the last session of the State legislature, will pour approximately $28,000,000 into the treasury of the State during the remainder of 1923, and all of 1924 and 1925, according to an announcement just made by the California State Automobile Association.

Registration fees and weight taxes on trucks during 1924 and 1925 will increase this total to approximately $37,000,000, according to the statisticians of the association.

All these funds can be used legally only for the maintenance and reconstruction of State and county highways.

METAL MARKETS

The steel market is in somewhat more of a chipper mood. The improved feeling, however, is not so much based on any new development as on the discovery that, compared with last month, October bookings make a very fair showing. With the exception of sheets, steel products were in very poor demand in September, so that the slight betterment noticed during the first three weeks of October is of little significance. That steel sellers make much of it, simply goes to show that they can always discover a bright side to a situation, no matter how gloomy it may appear to others. Although water shortage caused a diminished output in some of the western Pennsylvania steel plants, sheet mills were unaffected.

According to a report issued by the National Association of Sheet and Tin Plate Manufacturers, September sales of sheets were the heaviest since last March. Although the cut of $2 a ton in the price of black sheets which some mills have made for some time has become more general, so much so that the market range is now 3.75 @ 3.85 cents, demand for sheets has improved within the last week or two, and there is very little doubt that sheets today are being worked up faster than the prevailing rate of production.

The sheet market looks as if it had left the low point of demand behind, but there is no expectation of any early change in the price situation. The feeling that present prices for steel products will be maintained over the year's remainder has become stronger in the last few days, but no one expects to see any advances. In fact, the character of the buying has undergone no change. It is still strictly a from hand-to-mouth affair, the only sign of betterment being that there are more from-hand-to-mouth buyers. The generally heard opinion is that the market will move along at near its present gait until after Jan. 1, and if business as a whole is in a fair condition at the year's end, 1924 should bring with every successive week a more pronounced demand for steel products.

Such long distance views, of course, are always tied up with many "ifs," but there certainly is nothing in the air at present to cause consumers to anticipate their requirements by contracting for greater tonnages than they are accustomed to for the time being.

Pig Iron.—The market is absolutely neglected. Even single car orders are few and far between. Foundry iron is going begging at $24, valley furnace. Very little activity is noted in malleable, and automotive foundries have never been more apathetic.

Aluminum.—The market continues restricted to negotiations between the sole domestic producer and his regular trade for first quarter 1924 contracts, which, it is reported, are being booked slowly on a 25-cent basis for 98 to 99 per cent virgin ingots.

The Aluminum Co. of America is making extensive additions to its Bauxite plant at Bauxite, Ark., which enlargement is based largely on anticipated greater demand from the automotive industries.

Copper.—Cheap copper—and in the last few days electrolytic was at times offered at a fraction below 13 cents, delivered—never attracts domestic consumers, and the same condition appears to have set in with reference to fabricated copper and brass products. Even copper wire, which for some time was relatively a good seller, has turned very quiet.

Calendar

SHOWS

Nov. 4-10 — New York, First Automobile Exposition of the Foreign Automotive Association, Hotel Astor.

Nov. 11-17—New York, Annual Automobile Salon, Hotel Commodore.

Nov. 12-17 — Chicago, Annual Business Exhibit and Convention of the Automotive Equipment Association, Coliseum.

Jan. 5-12 New York, Annual Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Eighth Coast Artillery Armory.

Jan. 26-Feb. 2—Chicago, Annual Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

Jan. 26-Feb. 2—Chicago, Annual Automobile Salon, Hotel Drake.

Chicago .....Feb. 4-9 Tenth Annual National Motorcycle, Bicycle and Accessory Show, Broadway Armory, under the auspices of the Motorcycle and Allied Trades Association, A. B. Coffman, secretary.

FOREIGN SHOWS

Oct. 24-Nov. 2—Paris, Trucks, Agricultural Tractors, etc., Grand Palais.

Nov. 9-18—Buenos Aires, Annual Automobile Exposition, under the direction of the Automovil Club Argentino.

Nov. 2-10—London, Automobile Show, Olympia.

Nov. 22-Dec. 1—London, Motor Transport Exhibition.

Dec. 8-19—Brussels, Passenger Cars, Trucks, Airplanes and Motor Boats, Aviation Palace.

RACES

Oct. 28—Barcelona, Spain, Grand Prix for vehicles of 1500 c.c.; Nov. 1, International Grand Prix for cycle cars of 1100—Nov. 4, International Grand Prix for two liter.

Nov. 29.—Los Angeles.

CONVENTIONS

Nov. 16-17—Washington, D. C., First Annual Meeting of the National Motorists' Association.

Nov. 20-21—Dayton, Ohio, Factory Service Managers' Meeting of the National Automobile Chamber of Commerce in cooperation with the Society of Automotive Engineers.

Nov. 21—Annual Meeting, Motor Truck Industries, Inc., Place of Meeting Not Decided.

Jan. 24-31 — Chicago, Annual Convention and Show of the American Road Builders' Association, the former to be held in the Congress and the latter in the Coliseum.

May, 1924—Detroit, International Motor Transport Congress under the auspices of the National Automobile Chamber of Commerce.

S. A. E. MEETINGS

Oct. 29—Buffalo Section, Problems in the Construction of Low-Pressure Tires, J. F. Palmer, Statler Hotel, Buffalo, 8 p.m.

Nov. 1—Detroit Section, Development of the Commercial Airplane, W. B. Stout, General Motors Building, Detroit, 8 p. m. Dinner 6.30 p. m.

Nov. 2 — Washington Section, Repainting and Refinishing Automobile Bodies, C. O. Thomae, Cosmos Club, Washington, D. C., 8 p.m.

Nov. 6—Dayton Section, Better Automobile Headlighting and the Importance of Accurate Equipment and Proper Adjustment, R. N. Falge, Joint Meeting of the Dayton Section of the S. A. E. and the Dayton Engineers' Club, Dayton Engineers' Club, 8 p.m.

Nov. 6—New England Section, Brakes, W. S. James, Hotel Buckminster, Boston, 8 p.m., Dinner, 6.30 p.m.

Nov. 7—Minneapolis Section, Analysis of Various Four-Wheel Brake Designs, C. W. Jacobs, Manufacturers' Club, Builders' Exchange, Minneapolis, 8 p.m.

Nov. 8—Indiana Section, Records of Spring Movement in the Action of Cars, T. J. Little, Jr., Severin Hotel, Indianapolis, 8 p.m., Dinner, 6.30 p.m.

Nov. 9—Mid-West Section, The Relation of the Automotive Manufacturer to Motor Transport, David Beecroft, Western Society of Engineers, Chicago, 8 p.m., Dinner, 6.30 p.m.

Nov. 15—Detroit Section, Gears — Is it Necessary to Grind? Round Table discussion, General Motors Building, Detroit, 8 p.m.

Nov. 15—Metropolitan Section, Commercial Air Travel, E. P. Warner, Automobile Club of America, 247 West Fifty-fourth Street, New York City, 8 p.m., Dinner, 6.30 p.m.

Nov. 19—Cleveland Section, Engineering Aspect of the Used Car, David Beecroft, Cleveland Hotel, Cleveland, 7.30 p.m., Dinner, 6.30 p.m.

Dec. 13—Metropolitan Section, Vehicles for Package Delivery.

Jan. 22-25—Annual Meeting of the S. A. E.—Detroit.

Feb. 14 — Metropolitan Section, Vehicle Depreciation.

March 13—Metropolitan Section, Replacement Parts and Accessories.

April 17—Metropolitan Section, Fleet Maintenance, F. W. Winchester.

May 15 — Metropolitan Section, What Roads and Steels Do to Automobiles.

Championship Points Returned to Murphy

NEW YORK, Oct. 22—Following the return from Italy of Jimmy Murphy, the Contest Board of the American Automobile Association has restored to him the championship points which it took away from him as punishment for making the European trip without the necessary leave of absence. Petitions from promoters and drivers for the reinstatement caused the Contest Board to reconsider its action.

Murphy drove his first race following this action at Kansas City yesterday, finishing second to Fengler. Hearne, however, ran third, thus holding his lead in this year's championship point battle with a total of 1502 to Murphy's 1330. The season ends with the Los Angeles meet on Thanksgiving Day.

Wade Special Wins at Kansas City

KANSAS CITY, MO., Oct. 21—Driving at an average of 113 2-5 m.p.h., a record for the new type of one-man racing cars of 122 cu. in. piston displacement, Harlem Fengler of Kansas City, in a Wade Special, the only Kansas City car of the fourteen entered, won the second 250-mile race to be run over the one and one-fourth mile Kansas City speedway yesterday.

The official time of the race was 2 hours 12 minutes 55 2-5 seconds. The Wade Special was powered with a Miller engine. The former record of 111 5-10 m.p.h. was established by Eddie Hearne in winning the race in Altoona, Pa.

Jimmy Murphy in a Durant Special was second; Eddie Hearne in a Durant, third, and Harry Hartz, who replaced Jerry Wonderlich in a Durant late in the race, was fourth. The others to finish were Bennett Hill, fifth; Dave Lewis, sixth; Frank Elliot, seventh; Ralph DePalma, eighth, and Leon Duray, ninth. Cars driven by Earl Cooper, Tommy Milton, Harry Hartz, Ora Haibe and L. L. Corum were forced from the race with engine trouble.

Of the nine cars that finished only three were able to go the entire distance without stopping at the pits. These were driven by Fengler, Hearne and Elliot.

Italy Votes Big Credit to Build Sicilian Roads

PARIS, Oct. 13 (by mail)—A credit of 200,000,000 liras, to cover a period of five years, has been voted by the Italian Government for the improvement of existing roads and the construction of new roads in the Island of Sicily.

The work will begin at once and will be under the charge of the engineer who built the speedway at Monza, near Milan. Having few railroad facilities, Sicily is very much dependent on roads, but up to the present these have been the most neglected in the kingdom.

A special automobile road from Florence to the sea, passing through Prato, Pistoia, Pisa, Montecatini, and ending at Livourne is about to be constructed by a private association in Toscany.

Speed Records Made in Cycle Car Races

PARIS, Oct. 13 (*By mail*)—Lombard, driving a 45 cu. in. four-cylinder Salmson 2-seater car, averaged 62.3 m.p.h., for a distance of 185 miles, in the French cycle car road race, held on the permanent road course at the Mans. The best previous performance for this class of machine, over the same course, was 48½ m.p.h.

Senechal, driving a machine of his own make, finished one minute behind the winner. Two English Austins, driven by Waite and Roddis, were respectively third and fourth. The Salmson and the Senechal were equally matched so far as speed was concerned, but the former had some advantage by being equipped with front wheel brakes.

In the 67 cu. in. two-seater class, Benoist, on a Salmson, averaged 65.8 m.p.h. for a distance of 246 miles, compared with the best previous performance, over this distance, of 61¼ m.p.h. Speed was interfered with by heavy rain storms towards the end of the race. Casse, on a similar machine, was second, 10 minutes behind the winner.

Albert Divo, driving the 91.5 cu. in. four-cylinder Talbot-Darracq racer built on the same lines as the 122-in. Sunbeam Grand Prix racers, captured the international light car cup at Le Mans for the third time in succession, his average speed for the distance of 260 miles being 71.2 m.p.h. Moriceau, on a similar Talbot, came in second.